Descriptive Report

Myanmar Micro, Small and Medium Enterprise Survey 2019

April 2020

Nay Pyi Taw, Myanmar

Myanmar Micro, Small, and Medium Enterprise Survey 2019

Descriptive Report

Central Statistical Organization
Ministry of Planning, Finance and Industry

and

UNU-WIDER

Foreword

The 2019 descriptive report of the Myanmar Micro, Small, and Medium Enterprise Survey is the second quantitative report of the Myanmar Enterprises Monitoring System (MEMS) project. MEMS is a four-year project, which is implemented by the Central Statistical Organization under the Ministry of Planning, Finance and Industry (MOPFI). This report explores issues about the business practices, production and technology characteristics, networks, access to finance, employment and economic constraints and potentials. As such, the report describes important aspects of the development of the micro, small and medium-size manufacturing enterprises in Myanmar.

The MEMS project is financed by the Government of Denmark with technical cooperation provided by the United Nations University World Institute for Development Economics Research (UNU-WIDER) and the Development Economics Research Group (DERG) of the University of Copenhagen. The core of the project is a nationally representative survey of private manufacturing enterprises. Through comprehensive data collection efforts that include quantitative surveys conducted in 2017 and 2019, and qualitative and experimental approaches implemented in 2018 and 2020, the survey provides important information that will support the government in its efforts to assess and implement relevant industrial policies for the future.

High quality data and timely dissemination of statistical information about our industry sector is indispensable if we are to improve the life of the people of Myanmar through evidence-based policy formulation and implementation. Therefore, I consider it a great achievement that the Central Statistical Organization (CSO) under the Ministry of Planning, Finance and Industry has successfully continued and enhanced the MEMS project such that we now have detailed and consistent information about the industry sector covering the past five years.

I would like to acknowledge the diligent gathering and subsequent analysis of the detailed data required for a report of this quality undertaken by CSO, in particular the Industry, Mine and Energy Section, together with its international research partners UNU-WIDER and DERG. This is a report that I hope will reach many readers, from policy makers, planners, and researchers and indeed to business people, both in Myanmar and abroad. I am convinced that the findings of the survey, as disseminated in this report, will contribute to the ongoing improvement of the quality of economic policy discussions in Myanmar.

His Excellency U Soe Win
Union Minister
Ministry of Planning, Finance and Industry

EMBASSY OF DENMARK
Yangon

Foreword

Denmark is a committed development partner of the Government of the Republic of the Union of Myanmar (GoM); and the mutual understanding of our collaboration is spelled out clearly in the 2016-2020 Country Programme. It puts high priority on Inclusive and Sustainable Economic Growth, in line with the 2030 Sustainable Development Goals, the SDGs. The objective of Inclusive and Sustainable Economic Growth is under our collaboration being pursued through three Development Engagements, namely Sustainable Coastal Fisheries (the SCF), The Responsible Business Fund (the RBF), and The Myanmar Enterprise Monitoring System (the MEMS).

The MEMS Engagement is primarily a data development, policy research and capacity building engagement that aims, on the one hand, at improving information and knowledge about economic policy issues, and, on the other hand, at strengthening the GoM's capability to appropriately address key development challenges associated with the country's reform process, especially regarding SME development. Myanmar's transition to a market-based economy must at the core include rapid development of the private manufacturing sector, which has large potential for improving economic growth. But future advances will greatly depend on the policy and business environment in which manufacturing activities take place.

Accordingly, the cornerstone of the MEMS engagement is a rigorous and nationally representative Myanmar Micro, Small, and Medium Enterprise Survey focused on private manufacturing enterprises that is repeated every two-year. The present report disseminates information about enterprises that were included in both the 2017 and the 2019 survey rounds. The breadth of data and information is unprecedented, and it allows all of us to carefully examine enterprise performance and the business environment in Myanmar in depth.

I wish to recognize all of the hard work of the Central Statistical Organization (CSO) under the Ministry of Planning, Finance and Industry (MOPFI) and its staff headed by Director General U San Myint in this effort. A special thanks also to UNU-WIDER and to the professional staff at the Development Economics Research Group (DERG) at the University of Copenhagen that has provided invaluable technical support and capacity building. Denmark is pleased to be supporting the MEMS process, and we look forward to seeing how the data and research will be used towards better and more informed policy making in Myanmar.

His Excellency John Nielsen
Ambassador

Acknowledgements

This is an exciting time as we at the Central Statistical Organisation (CSO) advance gathering and dissemination of statistics and the whole statistical system in Myanmar. A new statistics law was enacted in January 2018, strengthening the relationship between producers and users of our national statistics. Moreover, the National Strategy for the Development of Statistics (NSDS) guides us in the development of high quality and accurate official statistics in Myanmar. The central task of unfolding the socioeconomic conditions in our country requires reliable statistics. Thus, Myanmar's official statistics must be based on thorough and transparent methods and operations.

Since private sector development is central for the country, the availability of high quality data on privately owned businesses is vital. The CSO is determined to generate the necessary data and statistics for evidence-based policy, planning and plan implementation in Myanmar. The data and results documented in this report allows a diverse set of users to study enterprise performance and the business environment in Myanmar in depth, including dimensions such as: firm performance, investment, access to finance, the labour force and perceptions about the constraints and potentials of the business environment.

I would like to thank all those who have worked with a steady commitment to undertake the Myanmar Micro, Small, and Medium Enterprise Surveys in 2017 and 2019. The financial support from the Government of Demark and the technical support of the UNU-WIDER and the Development Economics Research Group (DERG) at University of Copenhagen is greatly valued. I would also like to express my appreciation to the 2,725 enterprise owners and managers and the about 10,000 employees, from all states and regions of Myanmar, who answered our many questions.

San Myint
Director General
Central Statistical Organization,
Ministry of Planning, Finance and Industry

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Acronyms and abbreviations

CSO	Central Statistical Organization
DICA	Directorate of Investment and Company Administration
DISI	Directorate of Industrial Supervision and Inspection
GAD	General Administration Department
GDP	Gross Domestic Product
ILO	International Labour Organization
ISIC	International Standard Industrial Classification
MIC	Myanmar Investment Commission
MOALI	Ministry of Agriculture, Livestock and Irrigation
MOPFI	Ministry of Planning, Finance and Industry
MSIC	Myanmar Standard Industrial Classification
MSME	Micro, Small, and Medium Enterprises
PPS	Probability Proportional to Size
SD	Standard Deviation
SOE	State Owned Enterprise
SOEP	Socio-Economic Panel
SME	Small and Medium-Sized Enterprise
SSID	Small Scale Industry Department
UNDP	United Nations Development Programme
USD	United States Dollar
VAT	Value-added tax

Executive summary

The manufacturing sector should be seen as the backbone of Myanmar's economic development. A well-functioning productive industry has the potential to generate high-quality and poverty-reducing employment, fuel growth through enhanced productivity and improve the opportunities for trade in the globally connected economy of which Myanmar has recently become a more active member. However, a country's manufacturing sector is constantly evolving and transforming. Its success pivots on a deep appreciation of both the current state of the sector and changes that have occurred. This understanding can facilitate both timely and fact-based policy decision-making. Until recently, research into Myanmar's manufacturing sector has been limited. This report – the second edition in the series – offers a unique and thorough insight into how well the sector is performing and evolving during a period of broader economic change.

The Central Statistical Organization of the Ministry of Planning, Finance and Industry of Myanmar (CSO) in collaboration with the United Nations University World Institute for Development Economics Research (UNU-WIDER) and the Development Economics Research Group (DERG) at the University of Copenhagen, with financial backing from the Government of Denmark, released the first descriptive report of its kind in Myanmar's history in 2018. The report was based on a large quantitative enterprise survey undertaken in 2017.

However, the 'Towards Inclusive Development in Myanmar' project relies on rigorous ongoing enquiry to achieve its ambitious objectives of improved evidence-based policy-making and deep analysis. Therefore, in 2019, CSO and researchers from University of Copenhagen returned to Micro, Small and Medium-sized enterprises operating in 35 townships across Myanmar's fourteen states and regions as well as the Nay Pyi Taw Union Territory. They once again explored issues pertaining to business practices, owner characteristics, production and technology characteristics, sales and cost structure, access to finance, taxes, employment, networks, and economic constraints and potentials. During the face-to-face interviews, enumerators met with firm owners, managers, and thousands of their employees to learn of their experiences working in this sector.

The survey conducted in 2017 included interviews with 2,496 enterprise owners and 6,722 of their 32,671 employees, while the sample in the 2019 survey comprises 2,497 enterprises and 5,227 of their 34,435 employees. The surveys are statistically representative of more than 71,000 registered manufacturing firms in Myanmar. Over the period of study, just 9 per cent of the firms interviewed in 2017 had exited because of firm closure. This edition reports on a matched employer-employee dataset and balanced panel of some 2,268 enterprises, which participated in both phases of the study. Whilst some outcomes are similar across both phases, there have been broad and important changes over the relatively short period between surveys. Some of the key outcomes are reported briefly below and provide essential insights for gov-ernment and policymakers, domestic and international investors and all parties engaged in supporting Myanmar in achieving future prosperity.

A systematic approach is applied throughout the report in the descriptions of manufacturing firms' productivity, sectoral linkages, investment, external finance, employment, and business constraints. First, data is presented at the economy level. Then, information is provided to look at differences across the country's states/regions, amongst three size categories (micro,

small and 'medium & large', denoted medium+) and between eight aggregated industrial sectors. Data is also presented on a small set of 98 firms, denoted Myanmar Tigers. These are firms that have demonstrated high labour productivity growth between the two rounds of data collection.

The report shows that the manufacturing sector is more productive in 2019 than it was in 2017 and this is mainly explained through a deepening of capital intensity. However, this outcome is not borne of the same reasons across firms of different size categories. On average, enterprises of all sizes have increased their capital intensity while simultaneously employing more full-time labour, but the extent to which this has happened varies with firm size. The largest firms, the medium+ enterprises, have achieved both the highest growth in capital intensity and the largest positive change in full-time employment from 2017 to 2019. The 98 Tigers have increased their capital intensity across all firm size categories and aggregated industrial sectors and, by their nature, are the firms that have been the most productive amongst their peers in the last two years.

Outcomes in terms of both the level and growth of labour productivity is also diverse when considering geographical dispersion, firm size and the industrial sector in which the firm operates. These outcomes are pertinent for policymakers when deciding how to direct a package of support for future growth. Industrial zones have been at the forefront of the country's efforts for this sector. The report evidences that productivity growth rates are not higher for the average (non-Rice mill) manufacturing firms located inside Myanmar's industrial zones. However, the small and medium+ firms located in the zones have had markedly higher increases in employment compared to same size firms outside the industrial zones, and for medium+ firms this has not had negative effects on labour productivity growth.

Finally, a detailed statistical decomposition analysis shows that the majority of the increase in labour productivity between 2017 and 2019 may be explained by changes in inputs in production–especially intermediary inputs. The result highlights the importance of well-functioning input-markets in Myanmar's manufacturing sector. The increased capital intensity also contributed positively to the productivity increase, illustrating the importance of investments in the sector.

Well-functioning input-markets are important for three reasons. First, linkages between firms in the manufacturing sector go hand-in-hand with economic specialisation, which may improve productivity. Second, there is a potential for knowledge and technology diffusion, which offers the benefits of improved competitiveness and productivity. Third, well-functioning input and output markets are foundational for firms to survive and grow their businesses, while dysfunctional markets impose considerable constraints on firm growth.

It is unsurprising that firms continue to report highly localised sourcing and selling patterns, a fact that is particularly true for smaller firms. Medium+ firms do appear to have an increasingly international outlook, with a greater proportion of transactions taking place across country borders. Interestingly, less than 20 per cent of total output is sold as intermediary products, which suggest that local and international value chains have not yet been established effectively. A statistical analysis shows evidence of learning and knowledge transfer, which comes as a result of linkages between firms, both from customers to suppliers and the reverse, from suppliers to customers. This is an area that provides substantial future opportunity as the sector becomes more integrated in the world economy.

Finally, the data suggests that there are fewer supply constraints in 2019 compared to the situation in 2017. Unfortunately, clear conclusions cannot be drawn on whether this is the result of improvement in supplies or the economic slowdown experienced in Myanmar in recent years.

Turning to investment and borrowing decisions, the data shows that there has been a decline in the total number of firms investing in 2017-2018 compared to the two earlier years. However, increases in the amounts invested means total investment is broadly the same. In 2019, decisions to invest are centred on increasing capacity, which differs from efforts to improve products or processes reported in the 2017 survey. Investments are mainly and increasingly funded through retained profit and personal capital.

Fewer firms borrow money in 2018 than two years before, though many enterprises complain of a lack of access to formal credit. The average loan borrowed from formal sources continues to be small, but the amount drawn down has increased by about a half. Whilst fewer firms borrow from informal financiers in 2019 than was the case two years earlier, the size of informal loans has increased. Borrowers of informal loans pay substantially higher interest rates than they would to banks or other credit providers.

A formal statistical analysis of the effect of increased access to formal credit shows that such access may well induce more firms to invest. However, the likely impact is far lower that indicated by simple correlations of debt and investment behaviour. The analysis indicates that broad based access to formal credit would probably only increase the share of firms investing to about 13 to 15 percentage points.

Interestingly, overall the 98 Tigers are less likely to invest than other firms are. But, there is variation along the lines of industrial sector, with Tigers in the 'Rice mill' sector being 80 per cent less likely to invest. Conversely, medium+ Tigers invested 2.5 times more than other firms employing at least fifty people. However, the most striking conclusion is that this successful subset of enterprises is much more likely to invest to expand production than other firms in the sector.

This edition considers issues pertaining to employment from both the perspective of the employer and employee. Employment in the manufacturing sector is characterised by high levels of both gross and net turnover, indicating that worker instability (seen from the employer perspective) and job security (seen from the point of view of workers) may be a concern. On the other hand, it may also indicate a flexible labour market with low search costs. Unpaid family workers continue to be employed mainly by micro family firms, whilst women are more likely to be employed in firms employing at least 50 people. Migration remains a feature of the overall story of employment in Myanmar, with 11 per cent of employees being domestic migrants. Ayeyarwady Region is the predominant provider of migrant workers, whilst firms in Yangon Region are the main employers of those who have migrated.

Wage levels increased substantially from 2017 to 2019, and salaries tend to increase with firm size. The returns to education in the form of average wage premiums for higher educated employees are low compared to other countries in the region and they fell for the highest educated workers from 2017 to 2019. In 2019, there is still a positive return for employees with high school education and above, though. A large part of the higher wage levels for educated workers can be attributed to the fact that such workers tend to be employed in high wage sectors.

Moreover, male employees are paid substantially higher salaries than female employees even when educational and industry sector differences is taken into account.

Exactly what has driven the large increase in wages across the manufacturing sector cannot be inferred from the statistical descriptions and analyses. However, the large growth in average labour productivity, measured by both revenue and value added growth per full-time employee lends support to an assertion that the employees simply get a share of the increased value creation.

The changing perceptions of owners regarding constraints to their business are also reported in the current edition. In 2017, owners explained that they were constrained due to lack of access to credit, but that they wanted to invest and expand as a result of facing only limited competition. In 2019, a much larger proportion of owners acknowledged higher competition levels and had a reduced appetite to expand. The increased proportion of firm owners reporting reduced demand is a concerning result. It appears to lead to the conclusion that challenging macroeconomic conditions have impeded expansion plans to the extent that the future growth potential of the sector could be substantially affected.

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The present report supports the conclusion that the manufacturing sector remains instrumental for Myanmar's economic growth. However, the changing picture in issues pertaining to productivity, sectoral linkages, investment and finance, employment, and business constraints leads to a need for considerations of renewed policies that support economic growth.

Some considerations include efforts to:

- Facilitate the further deepening of value chains, enabling firms to specialise and cooperate for increased productivity.
- Make efforts to improve connections to international value chains in food production.
- Invest in market-facilitation for sectors in which firms experience input constraints.
- Review the effectiveness of the industrial zones; specifically whether the acceptance of micro firms to such designated areas is in the best interests of the economy.
- Ensure that small, medium and large firms are able to access formal finance for investments that could lead to improvements in productivity.
- Incentivise training and up skilling opportunities for micro and small firms, particularly when productivity increases amongst these size categories can be achieved.
- Gain a deeper understanding of gross worker flows, the provision of contracts and the formation of wages.
- Ensure that a fair and inclusive labour market also embraces the gender dimensions in terms of employment opportunities and fair wages.

1. Introduction

This report presents results of the Myanmar Micro, Small, and Medium Enterprise (MSME) surveys from 2017 and 2019 that follow manufacturing micro, small and medium enterprises. To depict the situation in the private manufacturing sector, data were collected in June and July 2017 and subsequently in May and June 2019 covering all 14 regions and states of the country, as well as the Nay Pyi Taw Union Territory. The data were collected through face-to-face interviews with firm owners or managers, and employees. This has resulted in two linked matched employer-employee datasets, which holds information on both enterprise and individual employee outcomes. The 2017 survey interviewed 2,496 enterprises and 6,722 of their employees while the survey in 2019 comprises 2,497 enterprises and 5,227 employees. The surveys are statistically representative of about 71,000 manufacturing firms in Myanmar.

The information contained in the datasets allows for analyses of many dimensions of enterprise performance and the business environment in Myanmar. In the present report, focus is on summary descriptions of a sample of 1,971 registered enterprises that were operating both in 2017 and 2019. By describing enterprises operating in both years, the report can give a fo-cused picture of the changing business environment for existing firms, which is not blurred by changes in the sample composition. This choice may exclude important dynamics if new en-terprises are substantially different from those operating in 2017. However, among the 229 enterprises that were included as replacements for firms that closed in between the 2017 and the 2019 survey, only eight were established after 2016. Hence, inclusion of the 229 replace-ment firms in the descriptive statistics in this report would not entail much information about new enterprises. As will be apparent from the report, much has happened for firms operating in both years and as such firms constitute the vast majority of the manufacturing sector a bet-ter knowledge of these firms is vital for a deep understanding of the economic situation in Myanmar.

The legal frame for small and medium enterprises (SMEs) is set by the 2015 Law on the Development of Small and Medium Businesses (Pyidaungsu Hluttaw Law No. 23/2015), which defines SMEs based on the number of employees, type of activity, capital invested or level of turnover. Small manufacturing enterprises have fewer than 50 employees and less than 500 million Kyats of capital. Labour-intensive manufacturing enterprises are considered small with up to 300 employees and less than 500 million Kyats of capital. Medium manufacturing enterprises are those with more than 50 and fewer than 300 employees (301-600 employees in case of labour-intensive manufacturing) and up to 1 billion Kyats of capital.

While the 2015 Myanmar SME Development Law does not define characteristics of micro en-terprises, the definition can be found elsewhere. For instance, the World Bank defines micro enterprises as those with nine employees or fewer, small-scale enterprises as those with 10–49 employees, medium-sized enterprises as those with 50–299 employees, and large enter-prises as those with more than 300 employees.[1]

Most SME definitions are based on the number of employees, as this is the simplest indicator to observe. In line with this recognition, the classification used in this report is based only on

[1] The EU's and OECD's definitions assume that large firms have more than 250 employees, while the United States assume 500 employees as the threshold between medium and large firms.

the number of permanent and temporary employees, following the cut-off points used by the World Bank.

In Myanmar, all SMEs with private capital investment must register with relevant authorities. Unfortunately, business registration is not straightforward, because of an unclear distribution of responsibilities among government agencies. As such, SMEs may be registered with any of the following authorities: the Directorate of Investment and Company Administration (DICA), the Small Scale Industrial Department (SSID), or the Directorate of Industrial Supervision and Inspection (DISI). In practice, municipal offices are the dominant authorities conducting the registration of industrial enterprises (CSO and UNDP 2016).

An enterprise can, in principle, register with multiple governmental agencies, and duplicate registrations cannot be avoided. However, they happen for specific purposes. For example, enterprises need to register with the DISI to be eligible for an SME loan. Thus, a company that has already registered, for example with the DICA, would need to re-register to be able to apply for a loan. Therefore, in the 2017 and 2019 MSME surveys, a formal firm is defined as an SME that possesses a municipal or any other relevant licence or registration document.

The classification of a firm's legal ownership follows several legal documents. The 1990 Myanmar Private Industrial Enterprise Law defines private industrial enterprises as any individual, partnership, or company that produces finished goods from raw materials, using any form of power in any building. This definition does not include cottage industries or joint ventures with the government. Further, the 1991 Promotion of Cottage Industries Law defines cottage industry as small-scale production, repair, maintenance, or service activities performed by family members or jointly between family members, with up to nine workers. The number of workers is not limited in the case of production of handicrafts.

The Myanmar Companies Act was enacted in the Pyidaungsu Hluttaw Law No. 29 in 2017 and superseded the 1914 Myanmar Companies Act. According to section 2 and 3 of this law, examples of companies that may be incorporated and registered include a company limited by shares, a company limited by guarantee, an unlimited company, a business association or an overseas corporation.

The present report focus on the following types of formal non-state enterprises: family businesses, private firms, partnerships, cooperatives, private limited companies, and joint venture companies. Family businesses are recognized by law as cottage industries. Private enterprises are defined in accordance with the Private Industrial Enterprise Law and other types of enterprises in accordance with the Myanmar Companies Act.

2. The data

This chapter describes the sampling approach and main data characteristics.

2.1. Preparation of the survey and data collection process

As mentioned in the introduction, survey data were collected in June and July 2017 and subsequently in May and June 2019 covering all 14 regions and states of the country, as well as the Nay Pyi Taw Union Territory. The data were collected through face-to-face interviews with firm owners or managers, and employees. The interviews were conducted in Myanmar language. In 2017, the questionnaires were administered on paper while in 2019 they were administered on tablets using the KoBo Toolbox platform.

The questionnaire draft for 2017 was designed following the experience of enterprise surveys in other South-East Asian countries. Adaptations were made through technical group discussions and a number of consultations between the collaborating parties. The final version was agreed upon after three pilot tests of the questionnaire in April, May and June 2017. The questionnaire was subsequently altered slightly from 2017 to 2019. Adaptations were again made through technical group discussions and a number of consultations between the collaborating parties.

In both years, there were questions on business practices, owner characteristics, production and technology characteristics, sales and cost structure, access to finance, taxes, employment, networks, and economic constraints and potentials. The reference period for all questions was the financial year 2016/17, running from April 1, 2016 to March 31, in the 2017 round while it changed to the calendar year 2018 in the 2019 round. In both rounds, the survey instrument was accompanied by a field operations manual and supervisor's monitoring sheet, which were prepared before the survey implementations started.

The initial training of supervisors for the 2017 pilot test was conducted over two days in Nay Pyi Taw. Supervisors from all 15 regional CSO branch offices were trained on methods of data collection through quantitative survey by UNU-WIDER experts. Further, two rounds of training of enumerators by supervisors lasting two days each were conducted, also in Nay Pyi Taw. The adoption of the tablets for the 2019 round was initiated by training of supervisors in Computer Assisted Personal Interviewing (CAPI) and the KoBo Toolbox over a two-day workshop in Nay Pyi Taw in November 2018. Two further rounds of supervisor training, lasting three days each, were also conducted in Nay Pyi Taw in March and April 2019.

Before both survey rounds were conducted, the questionnaires were piloted twice. The first pilot test of the questionnaire was focused on building supervisor capabilities. It involved a joint team of eight UNU-WIDER and CSO staff. The second pilot test focused on enumerator practice. In total, 90 officials from CSO and 3 UNU-WIDER staff participated in all phases of the questionnaire development and testing in 2017/2019.

The core survey team comprised 15 supervisors from CSO regional offices and 79 enumerators. The enumerators responsible for data collection were all employed by CSO, working for the township office, regional office, or at the headquarters in Nay Pyi Taw. Officers from CSO regional offices supervised their work. Independent supervision teams comprising the CSO Director General, Deputy Director General, Directors and officers from CSO headquarters of "Industry, Mines and Energy Section" visited several enumeration areas during the survey to ensure consistent data collection quality throughout the country.

Administering the survey on tablets in 2019 enabled an immediate forming of an online database. Further review of data quality and validation using statistical software (Stata, version 13-16) was conducted by staff from CSO, UNU-WIDER and University of Copenhagen while staff from University of Copenhagen finalised the data set and constructed the sampling weights.

To assess compliance and data accuracy, a joint CSO, UNU-WIDER, and University of Copenhagen team engaged in detailed data verification in August and September 2017 and 2019. The verification took place in townships of six regions in the country. The verification method comprised visiting a sample of firms and verifying the answer to some of the questions asked during the survey, such as establishment year, industry, form of legal ownership, labour, registration type, owner information, sales and buyer relations, investments, loans, and business challenges. The sample size for validation was determined based on the initial number of surveyed firms. The selection of firms for verification interviews was random. A total of 106 firms in 2017 and 65 firms in 2019 were visited during the validation trips.

2.2. The firm sample

Enterprises were sampled in 35 townships from all 15 regions and states in Myanmar, including the Nay Pyi Taw Union Territory. The sampling frames for private manufacturing enterprises are based on entries on the lists of registered enterprises kept by each municipality. The lists provide the following information about each firm: name, township, region/state, and industrial sector (Myanmar Standard Industrial Classification (MSIC) 4-digit codes). The sampling frames are restricted to the manufacturing sector (MSIC 2-digit codes 10–33). The approach for selecting firms adopted in 2017 (CSO and UNU-WIDER 2018) included selecting firms at random from previously randomly selected townships within each state/region. The lists of registered firms (the sampling frames) were stratified into rice mills (MSIC code 1063) and all other manufacturing firms in advance, which gave a stratified sampling frame of 19,783 rice mills and 51,443 other manufacturing firms in 2017. In 2019, all firms still in operation were re-interviewed and a subset of firms was selected from updated municipal lists to replace those firms that stopped operating between 2017 and 2019.

The lists of firms in 2017 and 2019 shows a decline in the total number of registered manufacturing firms. Over the two years, there has been a decrease of 1.5 percent, from 71,226 to 70,153 manufacturing firms. The registered firms in 2019 consisted of 20,311 rice mills and 49,842 other manufacturing firms. Hence, there were decreases in both strata of formal firms.

The regional distribution of the sampled firms, determined by the total sample size and the stratified two-step sampling approach, is reported in Table and Table with corresponding post-stratified sampling weights. The post-stratification of the weights is a simple rescaling of the inverse inclusion probabilities to ensure that the sum of the sampling weights equals the population of formal firms for each stratum. In 2017, 2,116 formal manufacturing firms were interviewed, while the sample comprised 2,192 firms in 2019. As seen, more firms were interviewed in Yangon Region, Nay Pyi Taw Union Territory and Mandalay Region in 2019, while the samples shrank in Rakhine State and Shan State.

Table 2.1: Sample size of formal other manufacturing firms by state/region

	2017			2019		
	Interviewed	Weight	Sum of weights	Interviewed	Weight	Sum of weights
Kachin	94	13.8	1,300	102	15.0	1,531
Kayah	67	10.3	691	64	10.7	687
Kayin	61	9.0	549	66	9.7	642
Chin*	5	29.8	149	4	30.8	123
Sagaing	195	27.7	5,411	195	34.9	6,797
Tanintharyi	87	15.8	1,373	84	14.7	1,238
Bago	162	24.1	3,900	157	40.4	6,344
Magway	141	20.8	2,927	150	16.7	2,504
Mandalay	267	39.3	10,491	281	35.9	10,092
Mon	110	22.4	2,466	111	29.2	3,244
Rakhine*	78	11.6	907	60	20.7	1,661
Yangon	296	43.9	13,007	320	26.5	8,478
Shan	156	22.5	3,508	148	20.0	2,961
Ayeyarwady	157	23.5	3,697	164	18.5	3,038
Nay Pyi Taw	63	16.9	1,067	78	6.4	502
Total	1,939		51,443	1,984		49,842

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: * In the stratification of the sampling, Chin and Rakhine are grouped together for sampling purposes given the limited number of manufacturing firms in Chin State.

Table 2.2: Sample size of rice mills and informal firms by state/region

	2017				2019			
	Rice mills	Weight	Sum of weights	Infor-mal	Rice mills	Weight	Sum of weights	Infor-mal
Kachin	10	95.4	954	18	9	105.2	947	11
Kayah	4	43.8	175	4	7	25.7	180	4
Kayin	4	54.3	217	12	2	113.5	227	9
Chin*	7	80.7	565	1	6	120.3	722	3
Sagaing	11	201.1	2,212	46	12	206.3	2,476	45
Tanintharyi	9	90.7	816	22	11	6.5	72	23
Bago	19	164.3	3,121	11	22	150.1	3,303	14
Magway	5	149.8	749	29	5	261.0	1,305	19
Mandalay	8	98.5	788	64	5	116.1	584	53
Mon	28	31.5	882	25	29	38.8	1,125	23
Rakhine*	15	131.9	1,978	23	30	75.7	2,270	26
Yangon	11	100.4	1,104	51	12	168.4	2,021	27
Shan	13	103.5	1,346	12	17	70.4	1,196	16
Ayeyarwady	25	181.9	4,547	44	30	120.8	3,625	32
Nay Pyi Taw	7	47.0	329	19	11	23.5	258	
Total	176		19,783	381	208		20,311	305

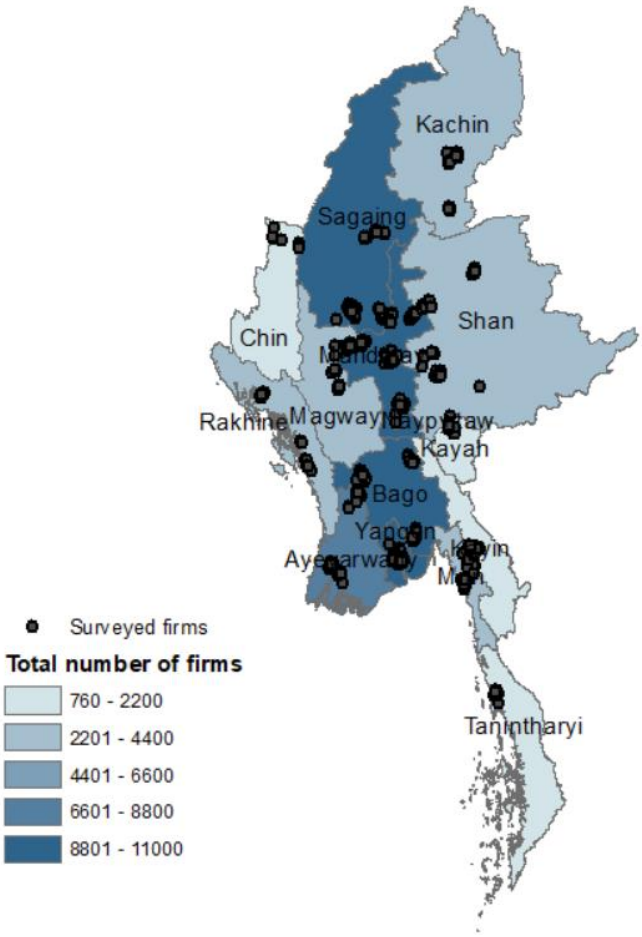
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: * In the stratification of the sampling, Chin and Rakhine are grouped together for sampling purposes given the limited number of manufacturing firms in Chin State.

Table 2.3: List of sampled townships and the number of firms sampled

State/Region	Township code (firms 2017/firms 2019)				
Kachin	10201 (42/42)	10404 (80/80)			
Kayah	20204 (75/75)				
Kayin	30301 (49/49)	30302 (28/28)			
Chin	40102 (13/13)				
Sagaing	50202 (51/51)	50501 (71/71)	50803 (130/130)		
Tanintharyi	60201 (118/118)				
Bago	70102 (51/51)	70205 (96/96)	70306 (45/46)		
Magway	80202 (116/116)	80301 (18/18)	80306 (40/40)		
Mandalay	90302 (65/65)	90503 (190/190)	90604 (84/84)		
Mon	100102 (163/163)				
Rakhine	110402 (43/43)	110502 (73/73)			
Yangon	120105 (94/94)				
Shan	130104 (15/15)	130404 (82/82)	130409 (30/30)	130904 (43/43)	131001 (11/11)
Ayeyarwady	140105 (115/115)	140401 (64/64)	140603 (47/47)		
Nay Pyi Taw	150202 (89/89)				

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). The balanced panel includes 2,268 firm observations each year.

Figure 2.1: Geographical distribution of all manufacturing and surveyed firms in Myanmar



Source: Authors' calculations based on Myanmar MSME 2017 data.

In addition to the sampling of formal enterprises, informal firms (i.e., firms that are not on the lists kept by the municipalities) were also surveyed in 2017 and 2019. As no records exist on informal firms in Myanmar, these were sought through on-site identification. Hence, informal firms were sampled from the same 35 townships as the formal firms. To the extent possible, informal firms interviewed in 2017 were also revisited in 2019.

Overall, the 2019 sample comprises more rice mills and fewer informal firms than in 2017. Most of the rice mills were added in Rakhine State and Ayeyarwady Region. The increase in the number of surveyed rice mills follows the general pattern of the increase in this activity observed in the economy as a whole. In contrast, the sample of informal firms shrank, the most of which in Yangon Region and Nay Pyi Taw Union Territory.

Table provides the township codes within each state/region selected through sampling, with probability of selection being proportional to the number of non-rice mill manufacturing enterprises in the township relative to the total number in the state/region. It also shows the number of firms sampled within each township both in 2017 and 2019. The locations of the selected townships are shown in Figure 2.1. The geographical distribution of the sample follows well the distribution of manufacturing firms in the population, whereby we observe that most firms operate in the central strip of Myanmar with much fewer in the border regions.

2.3. Firm exits between 2017 and 2019

The 2019 survey round sought to revisit all firms from 2017. Table documents the number of revisits, exits between 2017 and 2019 and replacement firms only surveyed in 2019. The two surveys have a sample of 2,268 enterprises that were interviewed in both 2017 and 2019. Of these, 1,971 firms were formal (among those were 169 rice mills) and 297 were informal. Moreover, in 2019, exit was confirmed for 228 enterprises included in the 2017 survey. This yields an exit rate of 9 per cent over two years; an average annual exit rate of 4.5 per cent, which is about half of the 9 to 10 per cent average exit rate observed for a number of developing countries by Liedholm and Mead (1999). Thus, an important first result of the MSME panel surveys is that exit rates appear to be very low in Myanmar compared to other developing countries.

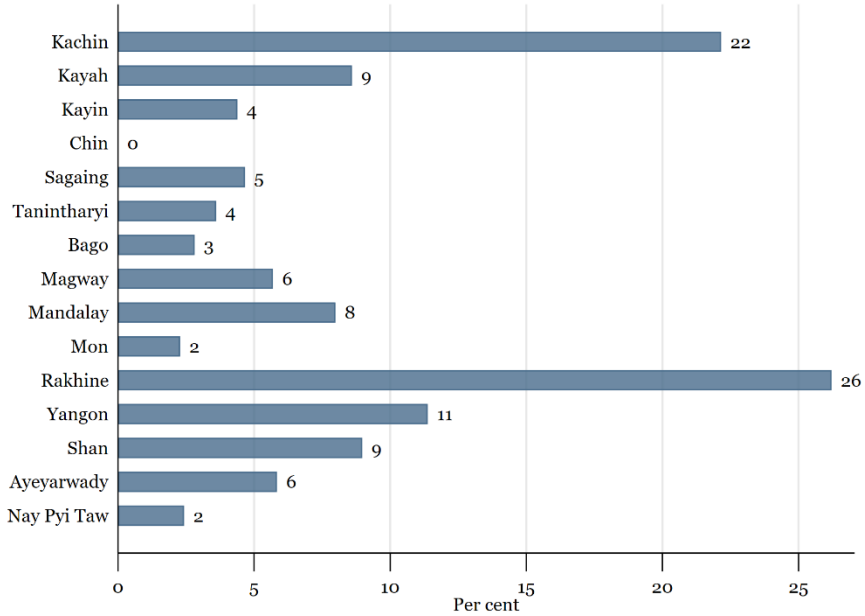
Table 2.4: Survival, exit and replacement overview

	2017	2019
Surveyed in 2017 and 2019	2,268	2,268
Surveyed in 2017, exit confirmed	228	
Replacement, surveyed in 2019		229
Total	2,496	2,497
Survival rate/replacement rate	90.9	100.04

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.

Focusing on the exit and survival for the formal firms, the survival rate is 92.6 per cent for rice mills, while it is 91.4 per cent for all other manufacturing firms. This difference is so small that, for practical purposes, survival rates can be considered equal for the two classifications of firms.

Figure 2.2: The percentage share of firms with confirmed exit, by region



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.

There is more substantial variation in survival rates across the states/regions. Figure 2.1 presents the percentage share of firms interviewed in 2017 with confirmed exits in 2019, distributed across states/regions. At the one extreme, in Rakhine State 27 per cent of the firms interviewed in 2017 were closed at the time of the revisit in 2019. At the other extreme, all 13 firms interviewed in Chin State in 2017 were also in operation and interviewed in 2019. KaChin State

is another place with a very high exit rate compared to the rest of the country. Despite the differences in survival/exit rates across the states/regions, it is difficult to point to a simple systematic variation, such as the number of firms or population size in the states/regions. However, the two large business hubs, Yangon and Mandalay, have survival rates in the upper end of the geographical distribution, indicating that competition may lead to higher exit rates. It is also worthy of note that two of the eleven large firms interviewed in Yangon in 2017, each with more than 400 full-time employees, closed between 2017 and 2019.

Along the size dimension, the survival rates are also remarkably equal. The survival rate among micro firms was 91.7 per cent while it was slightly higher for small, and medium and large firms at 93.6 and 93.2 per cent, respectively. Thus, micro enterprises have slightly higher exit rates than firms with more employees, although the difference is not substantial.

More detailed statistical analysis of the firms interviewed in 2017 indicates that geographical, sectoral and size dimensions are all of importance for enterprise survival. Nevertheless, a statistical model based on these dimensions is not able to predict that a single firm of the 228 confirmed exits would actually close. In that sense, the three dimensions do not determine individual firm survival.

Table 2.5: Number of interviewed workers by state/region

	2017				2019			
	All other manufacturing	Rice mills	Informal	Total	All other manufacturing	Rice mills	Infor-mal	Total
Kachin	261	11	54	326	232	14	35	281
Kayah	125	5	9	139	108	7	4	119
Kayin	84	4	16	104	78	2	12	92
Chin	6	7	1	14	4	6	3	13
Sagaing	635	40	127	802	464	23	68	555
Tanintharyi	259	18	39	316	221	13	36	270
Bago	392	54	23	469	287	42	25	354
Magway	504	13	67	584	344	8	26	378
Mandalay	839	25	160	1024	557	8	82	647
Mon	294	53	61	408	217	46	46	309
Rakhine	183	28	39	250	126	26	23	175
Yangon	956	23	117	1,096	859	25	44	928
Shan	520	29	32	581	336	23	32	391
Ayeyarwady	266	45	59	370	332	67	49	448
Nay Pyi Taw	165	24	50	239	235	32	0	267
Total	5,489	379	854	6,722	4400	342	485	5227

Source: Authors' calculations based on Myanmar MSME 2017-2019 data. Numbers refer to interviews with both employees and employers.

The distribution of interviewed employees by enterprise type and state/region in 2017 and 2019 is given in Table 2.5. A total of 5,227 employees responded in the 2019 sample, distributed as follows: 485 in informal firms, 342 in rice mills, and 4,400 in other manufacturing firms. The highest numbers of employees were interviewed in Yangon and Mandalay regions in both 2017 and 2019, indicating that the largest firms can be found in these two regions. Overall, fewer employees were interviewed in 2019 than in 2017, with the largest decline notable in Mandalay and Sagaing regions. More employees were interviewed in Ayeyarwady Region and Nay Pyi Taw Union Territory.

2.4. Sample characteristics for the 2017 and 2019 rounds

Firm location, type of activity, and firm size represent variations in market characteristics and enterprise organisation. As such, they strongly affect enterprise performance. Therefore, we

show an insight into the distribution of key enterprise characteristics by location, industry, and size in Tables 2.6 to 2.9.

Table 2.6 shows locations and enterprise sizes in the 2017 and 2019 data. Overall, the distribution by firm size has stayed stable over the two-year period. Micro firms comprise 74 per cent of the sample, while small firms comprise 20 per cent. Medium-sized firms account for 5 per cent of the sample, while large firms comprise 0.5 per cent. The states/regions with the highest prevalence of micro firms (more than 90 per cent) are Chin State (100 per cent), Kayin State (94.8 per cent), and Nay Pyi Taw Union Territory (91 per cent). The smallest proportion of micro firms can be found in Yangon Region, where there are about 30 per cent of micro firms, 44 per cent of small and about 24 per cent medium firms. About one-quarter of firms in Bago Region are small and about one in five firms in Mandalay and Ayeyarwady regions are small. Just as in 2017, large firms are found in only two locations: Yangon Region and Shan State. Therefore, in chapters 3-7 of this report the medium and large firms are classified together and denoted medium+ in tables and figures.

Table 2.6: Number of interviewed enterprises by state/region and firm size category

	2017					2019				
	Micro	**Small**	**Medium**	**Large**	**Total**	**Micro**	**Small**	**Medium**	**Large**	**Total**
Kachin	96	21	5	0	122	102	18	2	0	122
Kayah	66	9	0	0	75	68	7	0	0	75
Kayin	74	3	0	0	77	73	4	0	0	77
Chin	12	0	1	0	13	13	0	0	0	13
Sagaing	201	47	4	0	252	201	46	5	0	252
Tanintharyi	92	21	5	0	118	89	19	10	0	118
Bago	158	30	4	0	192	139	50	4	0	193
Magway	162	12	1	0	175	156	17	1	0	174
Mandalay	238	94	7	0	339	268	70	1	0	339
Mon	138	21	4	0	163	142	18	3	0	163
Rakhine	100	16	0	0	116	104	12	0	0	116
Yangon	127	139	81	11	358	106	157	85	11	359
Shan	146	30	4	1	181	149	27	4	1	181
Ayeyarwady	167	52	7	0	226	168	48	10	0	226
Nay Pyi Taw	74	15	0	0	89	81	8	0	0	89
Total	1,851	510	123	12	2,496	1,859	501	125	12	2,497
(%)	(74.2)	(20.4)	(4.9)	(0.5)	(100)	(74.4)	(20.1)	(5.0)	(0.5)	(100)

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.

Table 2.7 shows the main activity of enterprises in 2017 and 2019. Industry codes are based on the Myanmar Standard Industrial Classification (MSIC). As in 2017, the three largest industries in terms of the number of enterprises are food (MSIC 10), textiles (MSIC 13), and wood and wood products (MSIC 16). These three industries comprise around 60 per cent of all industrial activity in the sample and 70 per cent of the MSME population in Myanmar.

In Chapters 3 to 7 of the report the 24 MSIC2 manufacturing industries are regrouped into 8 aggregated industry sectors, as indicated in Table 2.7. Specifically, the "Rice mill" sector (MSIC4 1063) is singled out into industrial sector 1. Industry 2, denoted "Food, beverages and tobacco" is comprised of MSIC2 codes 10-12, excluding the rice mills while, Industry 3 is "Textiles, apparel and leather" from MSIC2 13-15. The fourth industrial sector is "Wood, paper and printing" consisting of MSIC2 16-18; Industry 5 is "Coke, chemicals, rubber and minerals" from MSIC2 19-23; Industry 6 is "Metal" from MSIC2 24-25; Industry 7 is "Electrical equipment, machinery and motor vehicles" from MSIC2 26-30 and finally Industry 8 is "Furniture and other manufacturing" from MSIC2 31-33. The regrouping is done to ensure reasonable sample sizes when descriptive statistics are computed at the industry level.

Table 2.7: Distribution across industries in the sample in 2017 and 2019

MSIC code	Industry name	2017 Formal	2017 Informal	2017 Total	2017 Per cent	2019 Formal	2019 Informal	2019 Total	2019 Per cent
10-12	**Food, beverages and tobacco**								
10	Food	878	125	1,003	40.2	922	93	1,015	40.7
11	Beverages	68	12	80	3.2	72	4	76	3.0
12	Tobacco	53	2	55	2.2	53	2	55	2.2
13-15	**Textiles, apparel and leather**								
13	Textiles	181	82	263	10.5	178	72	250	10.0
14	Wearing apparel	55	20	75	3.0	57	21	78	3.1
15	Leather and related products	19	8	27	1.1	19	7	26	1.0
16-18	**Wood, paper and printing**								
16	Wood and wood products	193	15	208	8.3	191	10	201	8.1
17	Paper and paper products	9	2	11	0.4	17	2	19	0.8
18	Printing and recorded media	12	4	16	0.6	15	2	17	0.7
19-23	**Coke, chemicals, rubber and minerals**								
19	Coke and refined petroleum	8	1	9	0.4	10	0	10	0.4
20	Chemical products	18	1	19	0.8	17	1	18	0.7
21	Pharmaceuticals	7	1	8	0.3	7	1	8	0.3
22	Rubber and plastic products	30	5	35	1.4	30	7	37	1.5
23	Non-metallic mineral products	112	43	155	6.2	114	30	144	5.8
24-25	**Metal**								
24	Basic metals	36	6	42	1.7	45	3	48	1.9
25	Fabricated metal products	148	22	170	6.8	151	17	168	6.7
26-30	**Elect. eqpt, machinery and motor vehicles**								
26	Computers, electronic and optical products	1	0	1	0.0	1	0	1	0.0
27	Electrical equipment	5	0	5	0.2	4	0	4	0.2
28	Machinery and equipment n.e.c. [a]	132	10	142	5.7	118	8	126	5.1
29	Motor vehicles etc.	3	1	4	0.2	6	0	6	0.2
30	Other transport equipment	6	3	9	0.4	3	3	6	0.2
31-33	**Furniture and o. manufacturing**								
31	Furniture	102	7	109	4.4	100	8	108	4.3
32	Other manufacturing	37	10	47	1.9	55	12	67	2.7
33	Repair and installation of machinery and equipment	3	0	3	0.1	7	2	9	0.4
	Total	2,116	380	2,496	100	2,192	305	2,497	100

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: [a] n.e.c. stands for 'not elsewhere classified'.

The composition of the sample has not changed much in the period 2017-2019. As the two extremes, the sample of firms from the food and paper industries increased by 0.5 percentage points, while the sample of firms in other manufacturing grew by 0.8 percentage points. The textiles industry decreased by 0.5 percentage points in the sample, while the wearing apparel industry increased by 0.1 percentage points. This is not surprising considering that the majority of the firms are present in both years.

2.6. The balanced sample

As this report aims at giving a statistically representative description of the dynamics of the formal manufacturing sector from 2017 to 2019, the report will focus on the formal enterprises that were interviewed in both survey rounds. Table shows that 2,268 enterprises were interviewed in both rounds and further that all firms interviewed in 2017 that did not respond in

2019 were confirmed exits. Among the surviving firms, 1,971 were formal and the report will primarily give statistical descriptions of these firms.

The summary statistics reported in chapters 3-7 use the sampling weights to provide population level estimates for the manufacturing sector. The sampling weights for the re-interviewed formal firms are the weights constructed for the 2019 survey round based on the most updated sampling frame, i.e. the most recent list of firms provided by each municipality. The sum of the weights is 61,923. This sum is an estimate of the total number of formal manufacturing firms that were in operation both in 2017 and in 2019. Naturally, the estimate is different from both the 71,226 enterprises listed in 2017 and the 70,153 enterprises listed in 2019. This implies that the present report neither describes closing nor newly established enterprises. The advantage of this choice is that changes recorded from 2017 to 2019 can be attributed directly to changes in the fixed group of surviving firms. Information about sample sizes and population sizes, both listed and estimated, for the two survey rounds and the balanced sample is given in Table 2.8.

Table 2.8: The samples in the two rounds, the balanced sample and the estimated total employment

		The two rounds		The balanced panel	
		2017	2019	2017	2019
Sample of formal and informal firms	Firms	2,496	2,497	2,268	2,268
	Employees	6,722	5,227	6,199	4,794
Sample of formal firms	Firms	2,116	2,192	1,971	1,971
	Employees	5,868	4,742	5,536	4,320
Population of formal firms	Firms	71,226	70,153	61,923	61,923
	Employees	1,115,441	910,853	792,444	800,711

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: The populations of firms in the two rounds are from the lists of firms provided by CSO. The sample employment statistics refer to the total number of employee-interviews conducted in firms. These include both interviews with employees and firm owners. The employment populations in formal firms are estimates based on the samples and calculated as the reported total employment multiplied by firm weights. Total employment is set to one if it is reported to be zero.

Table 2.9: The balanced formal panel, by sector and size categories

	Firm size			
Aggregated industrial sectors	Micro	Small	Medium+	Total
Rice mill	140	21	4	165
Food, beverages and tobacco	502	223	64	789
Textiles, apparel and leather	134	69	22	225
Wood, paper and printing	162	27	5	194
Coke, chemicals, rubber and minerals	101	48	17	166
Metal	157	25	2	184
Elect. eqpt, machinery and motor vehicles	100	20	2	122
Furniture and o. manufacturing	109	10	7	126
Total	1,405	443	123	1,971

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.

Finally, Table 2.9 gives a breakdown of the balanced panel sample of registered firms by enterprise size and the eight regrouped industries. Micro firms comprise 71 per cent of the firms with marked variation across the industrial sectors. The largest share of micro enterprises is in “Furniture and other manufacturing” (87 per cent) while the smallest share is in “Textiles, apparel and leather” (60 percent) closely followed by “Coke, chemicals, rubber and minerals” (61 per cent). Small firms, constituting 22 per cent of the sample, are mainly found in the two industrial sectors where micro firms have the lowest share with 31 and 29 per cent, respectively. As seen, only 6 per cent of the sample are medium and large firms, and these firms are mainly found in “Coke, chemicals, rubber and minerals” (10 per cent of the firms in the industry) and in “Textiles, apparel and leather” (10 per cent).

2.7. Myanmar Tigers

The level and growth of labour productivity is central for the development and international competitiveness of the manufacturing sector. Therefore, it is of considerable interest to learn from the high growth manufacturing firms. In order to facilitate such leaning, the data is used to identify and describe a small set of 98 firms, denoted Myanmar Tigers (or just Tigers) in chapters 3-7 of the report.

Myanmar Tigers are identified within each firm size category (micro, small and medium+). The Tigers are the enterprises in the top five per cent of their size category when it comes to growth in labour productivity from 2017 to 2019, where labour productivity is given as the value of output per full-time employee (see Chapter 3).

The distribution of Tiger enterprises across industrial sectors and size categories is shown in Table . Because the identification of Tigers is a share of each firm size category, there are most micro Tigers, by construction (5 per cent of 1,405 enterprises). Clearly, this selection does not imply that micro enterprises are the main drivers of the manufacturing sector. Instead, the comparison of Tigers and other enterprises should be seen as a comparison with high productivity growth firms that are actually within reach for the majority of the firms in the manufacturing sector.

Table 2.10: Myanmar Tigers, by sector and size categories

	Firm size			
Aggregated industrial sectors	**Micro**	**Small**	**Medium+**	**Total**
Rice mill	12	2	0	14
Food, beverages and tobacco	30	13	3	46
Textiles, apparel and leather	4	3	1	8
Wood, paper and printing	9	1	1	11
Coke, chemicals, rubber and minerals	6	3	1	10
Metal	5	0	0	5
Elect. eqpt, machinery and motor vehicles	2	0	0	2
Furniture and o. manufacturing	2	0	0	2
Total	70	22	6	98

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.

3. Production characteristics and productivity

Productivity growth is essential for raising living standards in Myanmar. The manufacturing sector constitutes an important engine of productivity growth for two reasons. First, manufacturing firms are typically more productive than their counterparts in agriculture and services. Therefore, structural transformation – the process whereby resources move from agriculture into manufacturing – can increase productivity levels. Second, productivity in the manufacturing sector tends to grow at a high pace in developing countries regardless of their country-specific characteristics. It is therefore important to understand the patterns of productivity dispersion and growth in the manufacturing sector.

This chapter first provides descriptive statistics on factors of production, capital and labour, in Myanmar's manufacturing firms. Second, output characteristics (revenue and value added) are outlined for each of the eight aggregated industrial sectors. Labour productivity levels, dispersions, and growth patterns are compared across industries, states/regions and firm sizes. Third, productivity differences between firms located inside and outside industrial zones are compared. Finally, a short analysis comparing the contribution to productivity growth from low-productivity and high-productivity firms is given.

3.1 Factors of production

Firm output (revenue) is determined by labour and capital inputs as well as a firm's ability to utilise these efficiently. The following paragraphs present descriptive statistics of these important factors of production and the degree to which firms invest in improving their quality.

3.1.1. Labour characteristics

Table 3.1 displays the weighted average and median number of full-time workers, labour cost per worker (in million Kyats), and changes in the number of full-time workers from 2017 to 2019 by industrial sector and firm size. On average, formal manufacturing firms in Myanmar have 11.6 full-time employees. Micro firms have, on average, 3.6 employees, whereas small and medium+ enterprises operate with an average of 15.7 and 114.1 full-time workers, respectively.

Firm sizes vary substantially between industries. On average, the smallest firms are "Rice mills" and those manufacturing "Metal". The largest firms operate in industries such as "Food, beverages and tobacco", "Coke, chemicals, rubber and minerals", and "Textiles, apparel and leather".

For all industries and firm size categories, the median number of full-time employees is smaller than the mean. This shows that there are a relatively large number of smaller firms within all industries and size categories. As such, small firms dominate the formal manufacturing sector in Myanmar. However, medium+ enterprises account for about 45 per cent of total employment in both 2017 and 2019.

The third and fourth column in Table 3.1 report the mean and median labour-cost per full time worker. The highest average (median) labour costs per full-time worker are found in "Rice mills" ("Electrical equipment, machinery and motor vehicles" and "Metal") whereas the lowest are found in "Textiles, apparel and leather" ("Coke, chemicals, rubber and minerals"). When comparing the mean and median of labour costs per full-time worker, there is a relatively high frequency of enterprises with low labour costs per full-time worker along all firm sizes. This is

especially true among micro firms, reporting the highest average labour costs per full-time worker, but simultaneously having the lowest median labour costs.

Table 3.1: Full-time workers, labour cost, and employment change by industry and firm size

	Full-time employees		Labour cost per full time employee (million Kyats)		Change in full time employees (2017-2019)		
	Mean	Median	Mean	Median	Mean (All)	Median (All)	Mean (Tigers)
Industries							
Rice mill	6.6	4.0	10.4	1.5	1.6	0.0	1.0
Food, beverages and tobacco	14.6	5.0	1.8	1.3	2.0	0.0	4.5
Textiles, apparel and leather	22.6	6.0	1.4	1.4	1.4	0.0	7.1
Wood, paper and printing	7.2	4.0	1.7	1.3	0.5	0.0	-6.6
Coke, chemicals, rubber and minerals	16.0	5.0	2.2	1.2	2.0	0.0	-17.7
Metal	5.4	3.0	1.9	1.8	-0.2	0.0	1.7
Elect. eqpt, machinery and motor vehicles	11.2	3.0	1.8	1.8	0.0	0.0	-7.0
Furniture and other manufacturing	8.5	4.0	1.8	1.6	2.4	1.0	-0.3
Firm size							
Micro	3.6	3.0	4.9	1.3	1.2	0.0	0.8
Small	15.7	12.0	2.0	1.7	1.1	0.0	-4.3
Medium+	114.1	72.0	2.4	1.4	8.4	0.0	7.9
Total	11.6	5.0	4.1	1.4	1.5	0.0	0.5

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Constant 2018 prices. 98% Winsorization applied to labour cost variable.

The last three columns of Table 3.1 show the mean and median change in the number of full-time employees from 2017 to 2019 among all manufacturing firms as well as the Myanmar Tigers. The average manufacturing firm increased by 1.5 full-time workers between 2017 and 2019, whereas the median change in full-time employment remained constant. Employment growth is primarily driven by medium+ firms, which have hired an additional 8.4 workers, on average. Micro and small firms, on the other hand, have only increased employment by just over one worker. Substantial differences exist in employment changes for the Myanmar Tigers. The results in the last column indicate that the productivity growth among some Tiger enterprises coincide with a shrinking workforce. In the industrial sectors "Coke, chemicals, rubber and minerals" and "Electrical equipment, machinery and motor vehicles", the Tigers have shrunk the number of full-time workers by an average of 17.7 and 7.0, respectively. Thus, the productivity increases in some Tiger enterprises may be the outcome of a deepened capital-intensity, where capital has been substituted for labour. The next section, focusing on capital, will show evidence that this may indeed be the case. However, the average Tiger has hired additional workers between 2017 and 2019. This is particularly the case for medium+-sized firms. These larger Tigers have coupled their productivity increases with an average increase in full-time employment of 7.9 workers.

Labour quality is an important determinant of firm productivity. The first two columns in Table 3.2 highlight the opinions of managers and firm owners on the quality of their current workforce and whether it has improved since 2017. The satisfaction with labour force qualifications vary across industries. It is highest in "Textiles, apparel and leather" and "Electrical

equipment, machinery and motor vehicles," where more than 40 per cent of managers and firm owners find that the quality of their workforce fully satisfies the needs of their firms. It is also evident that there is greater satisfaction when it comes to how qualified workers are in micro firms. Since these firms rely on less sophisticated production technologies (see Table 3.4), their higher level of satisfaction could be driven by a smaller need for skilled labour. Column 2 reports the percentage of owners/managers reporting that the quality of their labour force has improved over the last two years. 47 per cent state that this is the case in 2019. The improvements have occurred in larger firms in particular. However, the overall satisfaction with labour quality has decreased slightly from 2017, as seen from the last two rows in the first column, while a larger fraction of the owners/managers report that quality has improved.

Table 3.2: Labour quality and training

	Share of managers and firm owners reporting		Investment in training
	Quality fully Satisfactory (per cent)	**Quality has Improved (per cent)**	**Training at least 50 pct. of workers (per cent)**
Industries (2019)			
Rice mill	26.5	42.3	1.9
Food, beverages and tobacco	27.2	45.8	2.6
Textiles, apparel and leather	43.6	38.2	3.1
Wood, paper and printing	32.1	50.4	0.0
Coke, chemicals, rubber and minerals	28.3	50.3	3.4
Metal	30.6	55.2	2.3
Elect. eqpt, machinery and motor vehicles	45.4	63.5	0.3
Furniture and other manufacturing	27.4	58.1	2.3
Firm size (2019)			
Micro	33.5	45.2	0.8
Small	23.0	50.3	2.9
Medium+	21.0	58.6	19.7
Total 2019	30.1	47.0	2.2
Total 2017	35.1	44.9	2.1

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Data on quality of current labour force only exists for 2019.

Upgrading the skill level in the work force is an important part of improving productivity. Therefore, it is important to question whether firms in Myanmar invest in training of their workers. From the last column of Table 3.2, we see that only 2.2 per cent of firms trained more than half of their workers in 2019, which is essentially the same share as in 2017. Training efforts are highest in "Coke, chemicals, rubber and minerals", while they appear non-existent in "Wood, paper and printing". It is also clear that training efforts increase substantially with firm size.

3.1.2. Capital characteristics

Table 3.3 depicts the mean and median of capital (in million Kyats), capital per full-time worker, and growth in capital per full-time worker by industry and firm size in 2019. "Rice

mills" are the most capital-intensive firms with total assets per worker just above 65 million Kyats. This may be explained by the fact that some "Rice mills" are effectively collectivised, providing a milling service, and thus have few full-time workers and a high capital to labour ratio. As such, "Rice mills" in Myanmar do not necessarily operate under conditions similar to those in other industries. In contrast, "Textiles, apparel and leather" is a labour-intensive industrial sector and has the lowest capital/labour ratio – both in terms of the mean and the median. Pertaining to firm size, medium+ firms are the least capital intensive. The median medium+ firm reports a capital/labour ratio of 8.6 million Kyats, whereas the median for micro firms is 19.2 million Kyats in total assets per full-time worker.

Looking at the final three columns of Table 3.3, it is evident that manufacturing firms in Myanmar have had a positive gross change in their capital intensity from 2017 to 2019. The average capital/labour ratio is nearly four times higher in 2019 compared to 2017. However, the distribution of capital/labour ratios is skewed heavily to the right, as the median gross growth is much lower (30 per cent growth) than the mean (270 per cent). It is also evident that the average capital intensity has increased across all firm sizes, most significantly for larger firms. However, the median the capital/labour ratio has only increased by 10 per cent over the two years for small and medium+ firms, whereas it increased by forty percent in micro firms.

Table 3.3: Capital, capital-labour ratio, and growth in capital-labour ratio by industry and firm size

	Capital, million Kyats		Capital per full time employee, million Kyats		Gross growth in capital per full time employee, 2017-2019		
	Mean	Median	Mean	Median	Mean (All)	Median (All)	Mean (Tigers)
Industries							
Rice mill	301.2	106.9	65.6	26.6	3.2	1.5	5.2
Food, beverages and tobacco	309.0	108.5	46.1	18.4	3.9	1.2	7.3
Textiles, apparel and leather	147.2	43.4	14.9	6.7	3.7	1.3	6.8
Wood, paper and printing	205.0	67.2	47.9	19.2	4.1	1.3	9.2
Coke, chemicals, rubber and minerals	195.1	67.4	29.7	13.3	6.2	1.4	9.2
Metal	120.9	37.7	27.6	10.1	2.8	1.1	2.1
Elect. eqpt, machinery and motor vehicles	144.2	53.2	28.9	16.3	2.9	1.4	12.5
Furniture and other manufacturing	134.7	49.2	22.0	13.5	3.0	1.1	1.1
Firm size							
Micro	146.9	55.1	50.2	19.2	3.5	1.4	5.3
Small	378.2	159.7	29.7	11.7	4.3	1.1	8.5
Medium+	1087.0	1027.8	26.8	8.6	5.1	1.1	17.1
Total	246.1	80.8	44.2	16.3	3.7	1.3	6.0

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Constant 2018 prices. 98% Winsorization applied to capital and labour cost variables. Additionally, a 90% Winsorization has been applied to gross change estimates. Gross growth is calculated as capital per full time employee in 2019 divided by capital per full time employee in 2017.

The capital intensity has increased notably among Myanmar Tigers. In fact, the Tigers have experienced a higher average gross change in the capital/labour ratio across all industries and firm sizes, except in "Metal" and "Furniture and other manufacturing". It is useful to compare the results from the last column of Table 3.3 with changes in the number of full-time workers in Tiger firms reported in the last column of Table 3.1. In combination, these results show that

the high labour productivity growth among Tigers in industries such as "Coke, chemicals, rubber and minerals" and "Electrical equipment, machinery and motor vehicles" is driven by an increased capital-intensity, where labour has been substituted by capital. However, productivity growth in other industrial sectors has gone hand in hand with an expanding labour force and increased capital intensity. For instance, this is the case in "Food, beverages and tobacco" and "Textiles, apparel and leather". It is especially the case in medium+-sized Tigers, which report the highest average increase in the number of full-time workers (7.9 per cent, see Table 3.1) and the highest gross growth in the capital/labour ratio (17.9 per cent). This is the largest of the Tiger enterprises, which had an average of six times more capital per worker in 2019 compared to 2017. It shows how especially high-performing medium+ firms are able to combine productivity growth with labour absorption and capital deepening.

Table 3.4 highlights several qualitative aspects regarding the capital intensity of firms. The first three columns give an overview of the technological sophistication of manufacturing firms, the age of their production machinery, and its rate of utilisation. First, more than one quarter (26.1 per cent) of manufacturing firms in Myanmar rely solely on hand tools or manually operated machinery. This is a decrease from 2017 (30.6 per cent), suggesting that more sophisticated production technologies are beginning to take hold in the manufacturing sector. The least mechanised production is found among micro and small firms and in "Coke, chemicals, rubber and minerals", where more than half of all firms use only hand tools or manually-operated machinery. In contrast, only 16.1 per cent rely on these simple production technologies in "Electrical equipment, machinery and motor vehicles".

Table 3.4: Current status of capital and investments in improvements

	Current status			Investments in improvements		
	Hand tools/ manual machinery	Pct. under 5 years old	Utilisation	New technology/ processes	Number of new technologies/ processes	Adaptation
Industries (2019)						
Rice mill	17.1	57.6	77.1	16.6	1.7	88.5
Food, beverages and tobacco	27.5	52.6	84.1	6.4	1.9	61.1
Textiles, apparel and leather	22.5	46.5	91.0	3.8	2.8	64.9
Wood, paper and printing	28.7	53.8	82.1	4.4	1.4	50.4
Coke, chemicals, rubber and minerals	52.8	49.5	82.2	4.8	2.0	97.1
Metal	25.1	58.9	79.3	4.8	2.9	63.7
Elect. eqpt, machinery and motor vehicles	16.1	55.3	81.5	7.1	2.4	33.6
Furniture and other manufacturing	36.7	48.9	84.2	10.2	2.5	47.2
Firm size (2019)						
Micro	29.6	53.2	82.0	4.2	2.0	76.7
Small	17.7	56.1	81.8	20.4	1.8	73.4
Medium+	15.3	47.6	85.2	16.9	2.5	72.6
Total 2019	26.1	53.6	82.1	8.7	1.9	74.5
Total 2017	30.6	37.1	83.7	7.9	2.0	71.6

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Second, the machinery used is depreciating without being replaced. In 2017, only 37.1 per cent of firms operated with equipment more than five years old, whereas this share increased to 53.6 per cent in 2019. There are no major differences across either industrial sector or firm sizes. Third, the capacity utilisation (i.e. a firm's ability to increase production given its existing equipment/machinery) has decreased slightly from 2017 (83.7 per cent) to 2019 (82.1 per cent). Thus, firms report that they would be able to increase their output by 18.2 percentage points, holding capital inputs constant. Under-utilised capital may be a sign of inefficient production (more output could be produced by the same amount of input). However, since optimal utilisation rates also depend on input costs and expected demand, it is not possible to judge whether capital utilisation in Myanmar is optimal from Table 3.4.

The last three columns of Table 3.4 present statistics on the extent to which enterprises invest in improving their production technology. Just under 9 per cent of firms have introduced new technology or production processes in the last two years, incorporating an average of 1.9 new technologies or processes. Larger firms are much more innovative than smaller ones. Firms manufacturing "Textiles, apparel and leather" as well as "Wood, paper and printing" are least likely to invest in improvements, while "Rice mills" and firms operating in "Furniture and other manufacturing" are most likely to invest new technology/processes. Finally, of the firms investing in new technology or production processes, 74.5 per cent have made adaptations to existing machinery or equipment as part of the production upgrade.

3.2. Output characteristics

Rice milling is by far Myanmar's largest manufacturing sector in terms of total revenue, followed by "Food, beverages and tobacco" and "Textiles, apparel and leather" (Table 3.5). Firms in these industries also generate the highest average revenue. The smallest industrial sector in terms of revenue is "Furniture and other manufacturing", the lowest mean is found in the "Metal" industry, whilst the lowest median revenue is found amongst "Electrical equipment, machinery and motor vehicles" firms.

Table 3.5: Revenue by industry and firm size

	2019			Gross growth (2017-2019)		
	Sum	Mean	Median	Mean (All)	Median (All)	Median (Tigers)
Industries						
Rice mill	15,741,849	951.9	195.7	6.0	3.1	14.1
Food, beverages and tobacco	6,680,532	335.9	69.3	2.8	1.3	12.5
Textiles, apparel and leather	1,435,132	266.2	81.2	2.6	1.4	10.7
Wood, paper and printing	787,665	155.9	35.9	2.7	1.2	10.8
Coke, chemicals, rubber and minerals	834,130	176.8	38.3	2.5	1.2	10.0
Metal	413,009	96.0	29.5	2.5	1.1	12.7
Elect. eqpt, machinery and motor vehicles	425,493	147.6	27.2	1.9	1.1	10.2
Furniture and other manufacturing	311,646	99.0	33.7	3.5	1.9	12.5
Firm size						
Micro	11,710,061	265.7	39.1	4.0	1.6	13.7
Small	9,213,451	613.9	217.0	2.5	1.2	10.7
Medium+	5,705,942	2009.7	930.1	2.4	1.2	8.4
Total	26,629,454	430.0	65.1	3.6	1.5	13.2

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Numbers in million Kyats, constant 2018 prices. 98% Winsorization applied to revenues variable. Additionally, a 90% Winsorization has been applied to gross change estimates. Gross growth is calculated as real revenue in 2019 divided by real revenue in 2017.

The last two columns of Table 3.5 show the gross revenue growth from 2017 to 2019. The average gross growth in inflation-adjusted revenue is 3.6, meaning the average revenue was 3.6 times higher in 2019 compared to 2017. However, the distribution of gross growth rates is,

highly skewed to the right, and the median growth is considerably lower (1.5). Still, this indicates that the better half of the manufacturing enterprises in Myanmar had real revenue growth in excess of 50 per cent over the two years. However, this positive result is largely due to high revenue growth in the "Rice mill" industrial sector. Table 3.5 also shows that Myanmar Tigers have experienced substantial growth in revenue from 2017 to 2019 – across all industries and firm sizes. This indicates that the high labour productivity growth amongst Tigers is driven, at least partly, by increased revenues – even in the industries where the Tigers have much lower workforces.

Table 3.6 presents results for value added, which is calculated as the difference between an enterprise's total revenue and the cost of its inputs (intermediaries and raw materials) and indirect costs such as water and electricity bills. As such, value added describes the "extra value" a firm adds as a result of production, when they combine different inputs into a new product. Value added is therefore a better estimate than revenue in describing the actual value creation in a firm.

Table 3.6: Value added by industry and firm size

	2019			Gross growth (2017-2019)		
	Sum	Mean	Median	Mean (All)	Median (All)	Median (Tigers)
Industries						
Rice mill	4,261,353	257.7	27.5	6.3	2.1	14.8
Food, beverages and tobacco	1,920,286	96.5	20.6	3.1	1.3	12.5
Textiles, apparel and leather	406,306	75.4	16.7	2.6	1.2	6.8
Wood, paper and printing	211,566	41.9	13.5	2.7	1.1	6.9
Coke, chemicals, rubber and minerals	278,503	59.0	17.7	2.4	1.2	8.6
Metal	103,809	24.1	12.7	2.2	1.0	13.4
Elect. eqpt, machinery and motor vehicles	118,918	41.2	10.1	2.1	1.0	3.8
Furniture and other manufacturing	126,908	40.3	14.3	4.9	2.0	3.8
Firm size						
Micro	3,170,761	71.9	12.2	4.2	1.5	13.4
Small	2,844,558	189.5	49.9	2.8	1.1	10.1
Medium+	1,412,331	497.4	291.5	3.6	1.1	10.7
Total	7,427,650	120.0	18.1	3.8	1.4	13.0

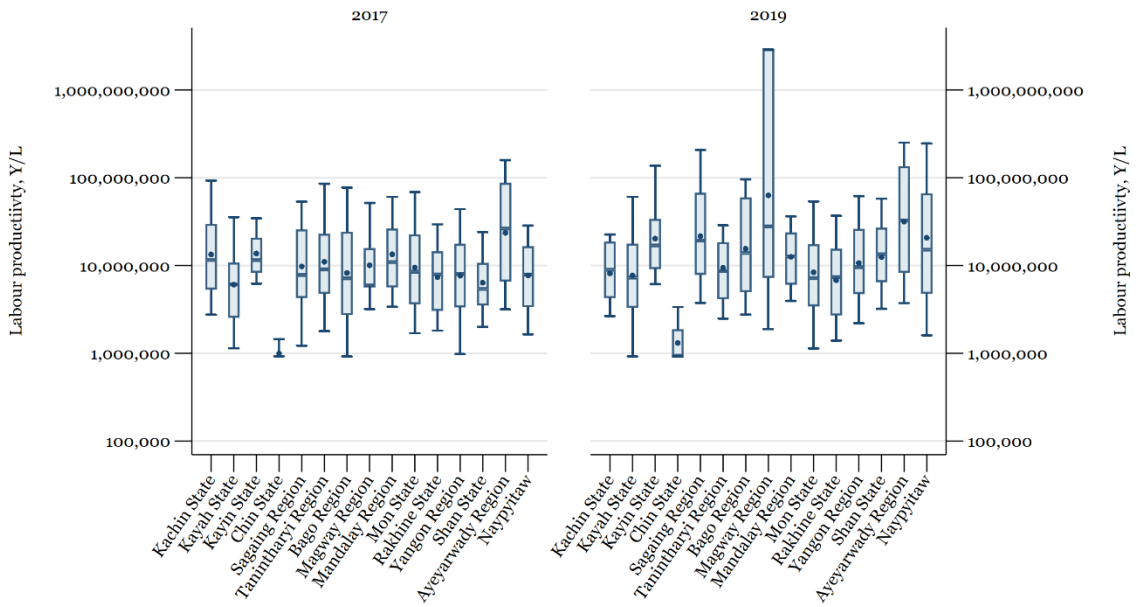
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Notes: Weighted estimates. Numbers in million Kyats, constant 2018 prices. 98% Winsorization applied value added. Additionally, a 90% Winsorization has been applied to gross change estimates. Gross growth is calculated as the value added in 2019 divided by value added in 2017.

Table 3.6 shows that "Rice mills" and firms within the industrial sectors "Food, beverages and tobacco" and "Textiles, apparel and leather" are the largest contributors to total value added. These industries also have the highest mean and median value added. Once again, the large difference between the mean and the median for rice mills suggests a highly skewed distribution, where some firms generate high value-added, whereas the typical firm generates far less. In terms of firm size, micro firms accounts for more than 40 per cent of the manufacturing sector's total value added, small firms contribute slightly less, and medium+ firms contribute one-fifth. Finally, the gross change in value added is very high. The average value-added figures are almost four times higher in 2019 compared to 2017, while the median gross growth is 1.4. It is particularly interesting to examine the growth in value added for the Myanmar Tigers, for which large differences are reported. The Tigers operating in "Rice mills", "Food, beverages and tobacco" and "Metal" have value added in 2019 which is on average 12 higher than their value added in 2017, whereas it is less than 4 times higher for the Tigers in "Electrical equipment, machinery and motor vehicles" and "Furniture and other manufacturing".

3.3. Productivity distributions and growth

This section dives deeper into productivity. As noted in the introduction to this chapter, productivity growth is essential to raise living standards in Myanmar. Therefore, it is important to identify the segments of Myanmar's manufacturing industry that are most productive and where productivity increases occur. In order to do so, this section presents distributions of labour productivity (revenue per full-time workers) over time across *(i)* states/regions, *(ii)* industries, *(iii)* firm sizes, and *(iv)* location inside or outside industrial zones. The final section compares productivity growth between low- and high-productivity firms.

Figure 3.1: Labour productivity by state/region



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Constant 2018 prices. Upper and lower whiskers of box plot indicate the 90th and 10th percentile, respectively. Upper and lower edges of box indicate the 75th and 25th percentile, respectively. The lines in the boxes denote the median while the dots give the mean.

Much of the analysis will be conducted using box plots. These plots allow for visual inspections of the distribution of productivity within each group. Productivity distributions contain valuable information. Wide distributions may indicate that firms operate under different condition and with vastly different technology, or it may indicate that market imperfections allow unproductive firms to operate alongside productive firms (assuming similar production technologies).

3.3.1. Labour productivity across states/regions

Figure 3.1 depicts labour productivity across regions in 2017 and 2019. The distributions of productivity rates are fairly similar across states/regions, with Chin State being an outlier.[2] It is often found that firms operating in larger cities are more productive than firms in rural settings, but the three states/regions with the largest cities (Mandalay, Yangon, and Nay Pyi Taw) do not stand out in terms of labour productivity. In 2019, Magway Region has a highly skewed labour productivity distribution, with the 90th percentile lying above one billion Kyats per full-

[2] The seemingly poor performance of Chin States should, however, be evaluated with caution given the small number of firms interviewed in the state (13 firms).

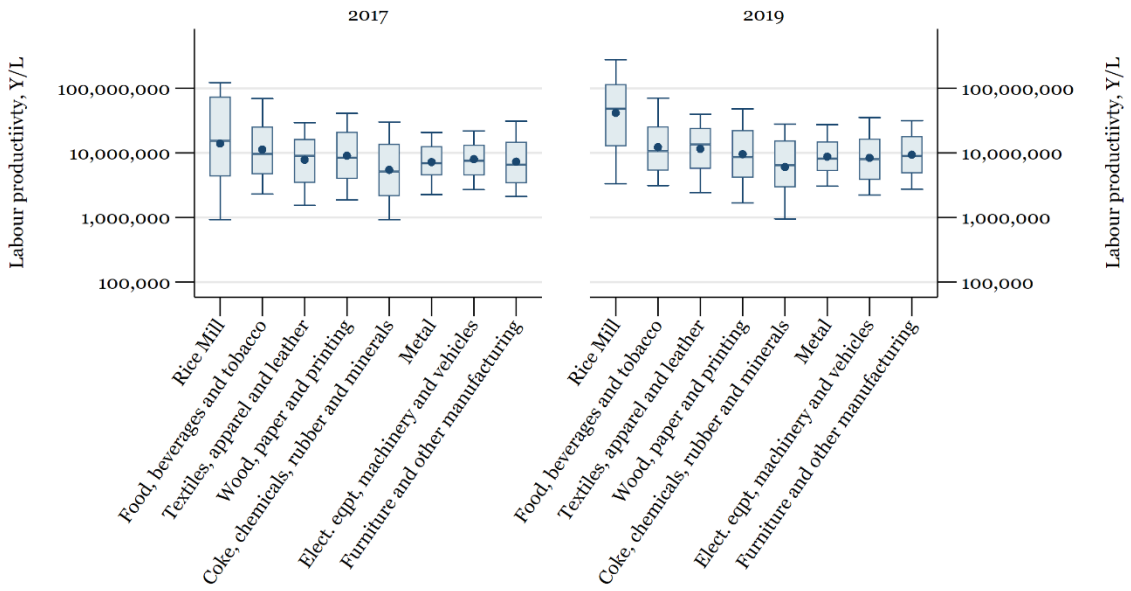
time employee. Therefore, it has the highest average labour productivity. The median firm in the Ayeyarwady Region has a higher labour productivity than in other states/regions.

The median productivity growth has increased substantially in Kayin State, Sagaing Region, Bago Region, Magway Region and Shan State. On the other hand, it seems to have declined in Nay Pyi Taw Union Territory, Mon State and Rakhine State.

3.3.2. Labour productivity across industries

Figure 3.2 compares labour productivity distributions across industries in 2017 and 2019. Three conclusions can be reached when analysing the box plots. First, rice mills had a higher median productivity than other industries – both in 2017 and 2019. Apart from "Rice mills", the median firm in "Food, beverages and tobacco" and "Textiles, apparel and leather" is also slightly more productive than in other industries. The least productive industry is "Coke, chemicals, rubber and minerals", as might be expected given the low capital intensity in that industry. This industrial sector also encompasses pharmaceutical manufacturers – an industry which is typically found to be highly productive. However, qualitative evidence suggest that many pharma-companies are small-scale, family businesses, selling alternative medicine, which may explain the low productivity at the industry level.

Figure 3.2: Labour productivity dispersion by sector



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Constant 2018 prices. Upper and lower whiskers of Box plot indicate the 90th and 10th percentile, respectively. Upper and lower edges of box indicate the 75th and 25th percentile, respectively. The lines in the boxes denote the median while the dots give the mean.

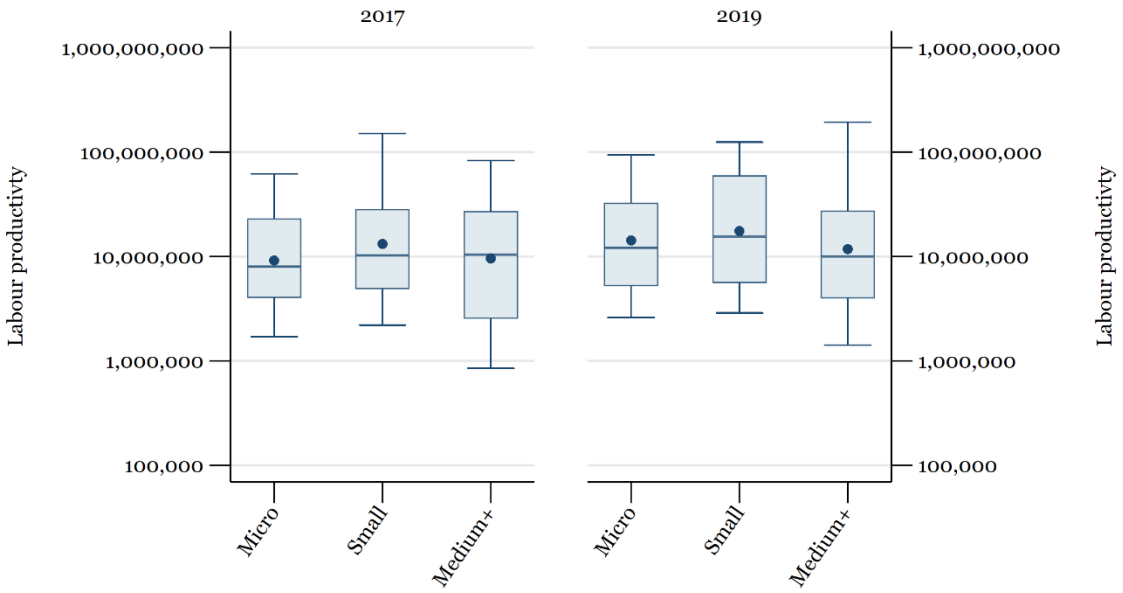
Second, the ranges of the productivity distributions vary substantially across industries. In 2019, the 90/10 ratio was widest in the "Rice mill" industry and tightest in the much smaller "Metal" industry. These data do not enable us to conclude whether distributional characteristics are an indication of perfect or imperfect markets and/or a feature of differences or similarities in productive technologies.

Third, different industries have experienced different productivity changes from 2017 to 2019. Median and average labour productivity appear to have grown in most industries, especially in "Rice mills", "Textiles, apparel and leather", "Metal" and "Furniture and other manufacturing". No substantial productivity growth is apparent in "Food, beverages and tobacco" and "Wood, paper and printing". Productivity dispersions are fairly constant over time in most industries. However, increased dispersion is a feature of "Rice mills" and firms in "Electrical equipment, machinery and motor vehicles".

3.3.3. Labour productivity across firm size

Apart from industry and geography, productivity dispersions and productivity growth in Myanmar also varies between firms of different sizes. Figure 3.3 suggest that both average and median labour productivity is highest in small firms. It further shows that the 10th and 90th percentiles have increased from 2017 to 2019 for all firm sizes (except the 90th percentile for small firms). Micro and small firms have also seen increases in median labour productivity.

Figure 3.3: Labour productivity dispersion by firm size

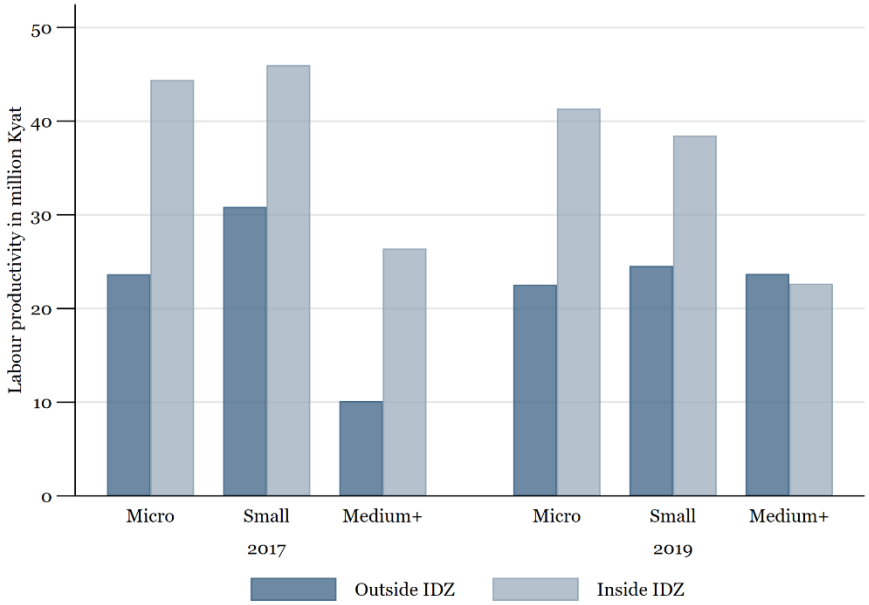


Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Constant 2018 prices. Upper and lower whiskers of Box plot indicate the 90th and 10th percentile, respectively. Upper and lower edges of box indicate the 75th and 25th percentile, respectively. The lines in the boxes denote the median while the dots give the mean.

3.3.4. Productivity, firm size and industrial zones

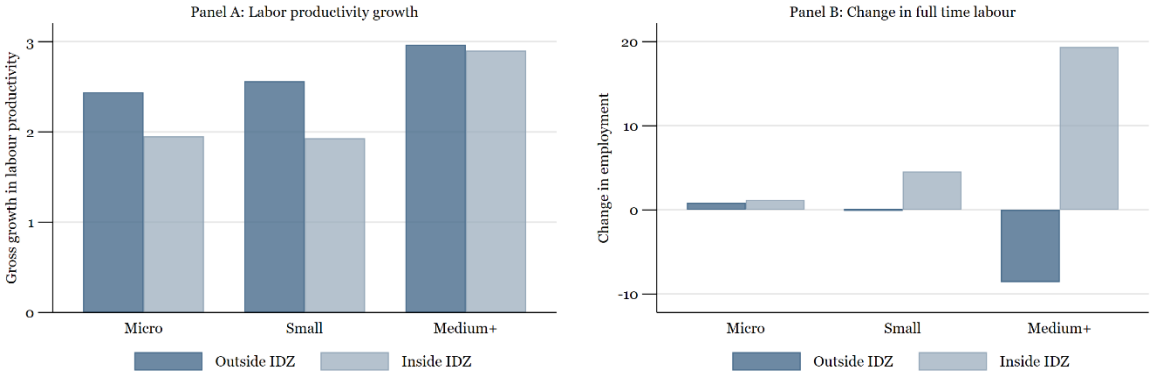
Industrial zones are at the forefront of Myanmar's industrial policy and evidence indicates that being located within these zones is associated with higher productivity (Khandelwal and Teachout 2016; Rand et al. 2019). This association is confirmed in Figure 3.4. However, the result only holds when "Rice mills" are not included in the comparison. Because "Rice mills" have a very large dispersion in labour productivity (as seen in Figure 3.2) and are not commonly placed in industrial zones, a comparison of productivity levels that includes such firms will distort the picture. The figure shows that average labour productivity for other manufacturing firms was higher for firms inside the industrial zones in both years and across all size categories. However, the productivity difference appears to have diminished from 2017 to 2019. In particular, this is an important feature for larger firms.

Figure 3.4: Labour productivity for other manufacturing firms inside/outside industrial zones by firm size



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Constant 2018 prices. 98% Winsorization applied to revenue variable.

Figure 3.5: Average growth in labour productivity and average change in full time labour for other manufacturing firms outside and inside IDZs, by firm size



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

The apparent convergence in labour productivity levels for firms inside and outside the industrial zones indicates that the growth rates in labour productivity have been larger for firms outside the zones. This conjecture is confirmed in Figure 3.5, which shows the gross growth in labour productivity and the change in full-time employed from 2017 to 2019 for the three firm size categories.

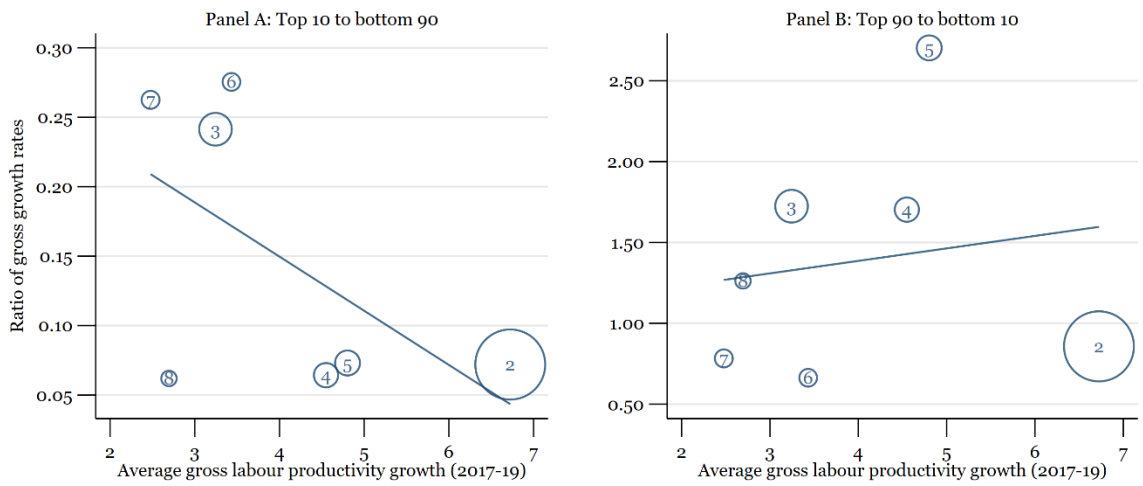
Panel A in Figure 3.5 shows that productivity growth has been higher for micro and small firms located outside the industrial zones compared to those located inside an industrial zone. For larger firms, the difference in average labour productivity growth between firms located inside and outside the zones is negligible. This observation may be concerning, as it indicates that

the actual services delivered in the zones do not help firms improve their efficiency. However, as shown in Panel B, for the larger firms there is a substantial difference in the change in full-time employment as firms inside the industrial zones have expanded their labour force, whereas similar firms outside the zones have expanded less or even shrunk their workforce (medium+ firms).

3.3.5. Productivity growth in high and low-productivity firms

This section provides a graphical analysis of the productivity growth performance of high and low-productivity firms in order to identify which type of firms have driven the productivity growth. Figure 3.6 plots the average productivity growth for each industry on the x-axis against the ratio of productivity growth between the top (bottom) ten per cent most (least) productive firms in 2017 and the 90 per cent least (most) productive firms in each industry on the y-axis[3]. In the plots, the "Rice mill"-industrial sector is excluded because of the special characteristics of this industrial sector in terms of the use of wage labour or renting out of the mills to customers.

Figure 3.6: Average labour productivity growth and ratio of productivity growth of top and bottom performing firms, by industry excluding rice mills.



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). The size of the markers indicates the sector's share of total revenue.
Legend: 2: Food, beverages and tobacco; 3: Textiles, apparel and leather; 4: Wood, paper, printing; 5: Coke, chemicals, rubber and minerals; 6: Metal; 7: Elect. eqpt, machinery and motor vehicles; 8: Furniture and other manufacturing.

Ratios are all well below 1 in Panel A of Figure 3.6, which implies the most productive firms in 2017 have experienced lower labour productivity growth compared to the rest. In this sense, there has been convergence (from the top) in labour productivity levels within industries. This leads to obvious questions surrounding the impact on the overall productivity. The scatterplot shows a very strong negative correlation between the relative growth of the most productive firms and the average productivity growth in each industry, indicated by the straight line in the figure. Panel B of Figure 3.6 shows that convergence in productivity levels from below is

[3] For example, the ratio of gross labour productivity growth for the top ten per cent most productive firms in an industry in 2017 and the 90 per cent least productive firms is calculated as follows: in each industry the ratio is calculated as: average(growth of top 10 productivity firms in 2017)/average(growth of bottom 90 productivity firms in 2017).

less systematic. In three of the seven industries, the bottom 10 per cent had lower productivity growth than the top 90 per cent, resulting in ratios of growth rates below 1. Furthermore, there is only a weak correlation between the relative growth rates of the 10 per cent least productive firms in each industry in 2017 and the average growth rate of the industry. Taken together, the two figures indicate that productivity growth is neither driven by the most or least productive firms in each industry. Rather, firms located towards the centre of the distribution must drive the productivity growth.

Finally, the markers in the figure are sized in accordance to each industry's share of total revenue. The plots thus indicate that the biggest industry, "Food, beverages and tobacco" has had the largest growth in labour productivity.

3.3.6. Production characteristics, productivity and informality

Production and productivity characteristics are often found to vary between formal and informal firms. This section investigates whether this is the case in Myanmar. Throughout the analysis, "Rice mills" are separated from other formal manufacturing firms given the unique characteristics of this industrial sector).

Table 3.7 takes as its point of departure the key production and productivity characteristics presented thus far in this chapter, comparing them between rice mills, other formal manufacturing firms, and informal firms. The first three columns present averages from the 2019 survey, whereas the last three columns show means of gross growth rates from 2017 to 2019. An exception is the case of full-time workers, where the difference in headcount of full-time workers is displayed.

Table 3.7: Key production characteristics for rice mills, formal, and informal firms

	2019			Gross growth (2017-2019)		
	All other Manuf.	Rice Mills	Informal	All other Manuf.	Rice Mills	Informal
Labour						
Full-time workers (L)	13.4	6.6	5.1	1.5	1.6	0.9
Labour cost per full-time worker	1.8	10.4	1.1	1.9	2.3	1.5
Capital						
Capital	226.0	301.2	60.7	3.9	3.7	6.1
Capital per full-time worker	36.4	65.6	23.1	3.9	3.2	5.6
Output						
Revenue	239.9	951.9	56.3	2.7	6.0	2.8
Value added	69.8	257.7	17.6	2.9	6.3	2.8
Productivity						
Revenue per full-time worker	25.4	263.3	15.8	2.4	4.4	2.4
Value added per full-time worker	7.0	70.1	4.8	2.5	4.9	2.5

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Notes: Weighted estimates for formal firm and rice mills. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Unweighted estimates for informal firms. Constant 2018 prices. Numbers in million Kyats. 98% Winsorization applied to capital and labour cost variables. Additionally, a 90% Winsorization has been applied to gross change estimates. All estimates refer to averages.
* Estimates are not gross growth rates, but average changes in the headcount of full-time employees.

The first two rows of Table 3.7 focus on labour characteristics. On average, formal manufacturing firms employ more full-time workers than rice mills, which in turn employ more workers than informal firms. Additionally, the employment gap between informal and formal firms seems to have widened from 2017 to 2019. While informal firms have expanded their workforce by an average of just below one full-time worker, formal firms and "Rice mills" hired 1.5 and 1.6 additional workers, respectively. Compared to informal firms, formal firms also report higher labour costs per full-time employee. This is an indication that informal firms pay lower wages, an observation that is explored further in Chapter 6.

On average, informal firms have a much smaller capital stock and they are less capital intensive (measured by the capital/labour ratio) than their formal counterparts. Interestingly, they have experienced a strong capital deepening from 2017 to 2019 and they seem to be catching up with formal firms. This is seen by comparing the average gross growth rate of their capital/labour ratio (6.1) with that of formal enterprises (3.9).

Columns 5 and 6 of Table 3.7 display statistics for revenue and value added, repeating the pattern for employment and capital. Informal firms are smaller, generate less revenue and add less value than formal enterprises. When looking at the average gross growth rates in revenue, the gap even seems to be widening over time. This is not true in the case of value added, where growth rates are similar. "Rice mills" report far higher output levels than formal firms in other industrial sectors.

The final two rows of Table 3.7 compare labour productivity (calculated as revenue and value added over full-time employees) between the three firm types. As already described in the sections above, rice mills appear more productive than other manufacturing firms (see Figure 3.2). Formal firms also report higher revenues per full-time worker than informal firms do. The same is true in the case of value added per employee, albeit to a lesser extent. Despite their lower levels of productivity, informal firms have achieved gross productivity growth comparable to their formal peers.

3.3.7. Productivity decomposition

The descriptive statistics presented in the sections above show that labour productivity have increased from 2017 to 2019. It is therefore natural to ask what has been driving this productivity growth at the firm level. Table 3.8 presents results from an Oaxaca-Blinder decomposition of the difference in average labour productivity between 2017 and 2019. The decomposition is based on linear regression models with labour productivity on the right-hand-side and the number of full-time employees, capital per worker, and intermediary inputs per worker as explanatory variables. All four measures are log-transformed in the regressions. Column 1 report the averages of the log of labour productivity in 2017 and 2019 as well as the difference between the two averages. Columns 2 and 3 give decompositions of the average difference into a part explained by changes in the average values of the explanatory variables and a part attributable to changes in the effect of the variables on productivity (parameter changes). In addition to the standard variables included in the regressions underlying column 2, the regressions underlying the results in column 3 also include industry and region/state fixed effects.

Column 1 in Table 3.8 shows that the log of labour productivity has increased by 0.4 log-points from 2017 to 2019, corresponding to an increase of 49 per cent in the (geometric) average labour productivity. When industry and region/state fixed effects are included in the regression (column 3), about 82 per cent of the difference can be explained by changes in the inputs in production; labour, capital per worker, and intermediary inputs per worker. The increase in intermediary inputs over the two years explains the majority of the difference on its own. About 18 per cent of the difference can be attributed to difference in the returns to inputs in the two years, which in turn can be attributed to significant increases in the productivity in larger firms.

Table 3.8: Productivity decomposition

	Averages (1)	Decomposition 1 (2)	Decomposition 2 (3)
Average labor productivity in 2019 (ln)	2.700***		
	(0.054)		
Average labor productivity in 2017 (ln)	2.298***		
	(0.037)		
Difference in averages	0.402***		
	(0.065)		
Change in inputs		**0.343*** **	**0.330*** **
		(0.046)	**(0.046)**
Full-time workers (ln)		0.023***	0.022***
		(0.007)	(0.007)
Capital per full-time worker (ln)		0.022***	0.021***
		(0.008)	(0.007)
Intermediary inputs per full-time worker (ln)		0.298***	0.282***
		(0.046)	(0.044)
State/region effects			0.005
			(0.006)
Sector effects			-0.0004
			(0.006)
Change in parameters		**0.059**	**0.072**
		(0.051)	**(0.048)**
Full-time workers (ln)		0.129***	0.153***
		(0.047)	(0.048)
Capital per full-time worker (ln)		0.119	0.121
		(0.082)	(0.072)
Intermediary inputs per full-time worker (ln)		-0.013	-0.073
		(0.074)	(0.081)
State/region effects			0.027
			(0.029)
Sector effects			-0.010
			(0.034)
Constant		-0.176	-0.147
		(0.092)	(0.076)

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: The regressions are based on 1,971 firm observations in each year, giving 3,942 observations in total. Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Robust standard errors in parentheses. The asterisks indicate statistical significance of the estimated parameters at different levels of significance: *** p<0.01, ** p<0.05.

3.4. Closing Reflections

This chapter has presented production and productivity characteristics of Myanmar's manufacturing sector. Manufacturing enterprises of all sizes have substantially increased their capital intensity while simultaneously employing more full-time labour, but the extent to which this has happened varies with firm size. On average, Medium+ enterprises have achieved both the highest capital/labour growth and the largest positive change in full-time employment from 2017 to 2019.

The chapter has also shown how labour productivity and productivity growth varies across industries, states/regions and firm sizes. This is important because such segmentation potentially signals which firms need support and which are likely to drive productivity growth in the years to come. Given the results presented here, a "top performer" could be described as (i) a small and formal firm (ii) located in the Ayeyarwady Region, and (iii) operating in "Food, beverages and tobacco".

The importance of industrial zones was also investigated. It appears that productivity growth rates are not higher for the average (non-Rice mill) manufacturing firms located inside Myanmar's industrial zones. However, the small and medium+ firms located in the zones have had markedly higher increases in employment compared to same size firms outside the industrial zones, and for medium+ firms this has not had negative effects on labour productivity growth.

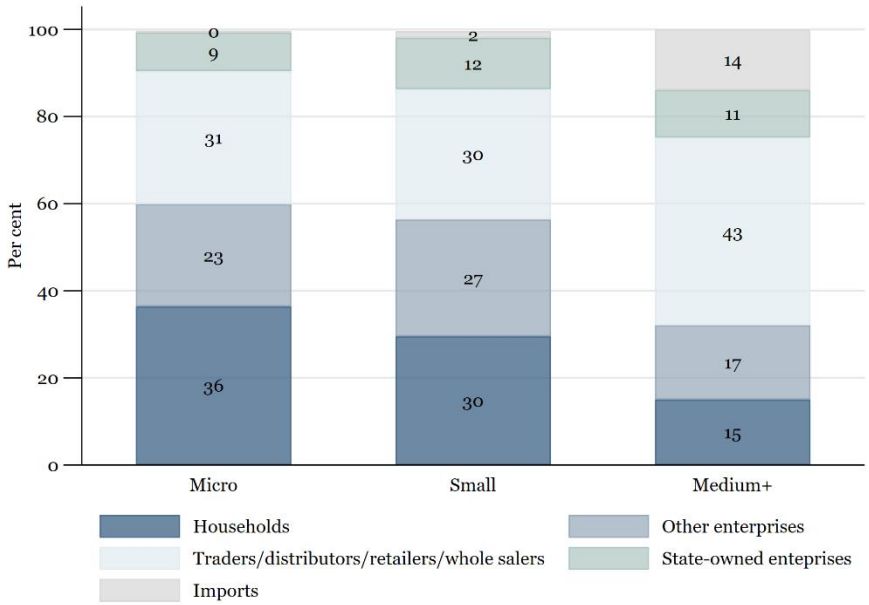
Finally, it has been shown that the majority of the increase in labour productivity between 2017 and 2019 may be explained by changes in input in production – especially intermediary inputs per employee. The result highlights the importance of well-functioning input-markets in Myanmar's manufacturing sector, which is one of the topics described in the next chapter.

4. Sectoral linkages

The supplying and sourcing relationships between firms is important. First, inter-industry linkages go hand-in-hand with economic specialisation and are therefore important for productivity. Second, supplier-buyer relations hold a potential for knowledge and technology diffusion. Third, well-functioning input and output markets are foundational for firms to survive and grow their businesses, while dysfunctional markets impose considerable constraints on firm growth. This is a concern in Myanmar, where owners/managers ranked "lack of market outlet" and "lack of raw materials" as the first and second most important problem they face when starting up a new project.

Against this background, the present chapter provides an overview of the input-output structure of the manufacturing sector and the sourcing and supplying characteristics of its enterprises. The first section portrays the input side, focusing on the characteristics of the supplier base and availability of inputs for firms across industries and states/regions. Section 4.2 focuses on output characteristics. It explores customer base, product and customer diversification and embeddedness into value-chains as suppliers of intermediary goods. The final section explores the extent to which learning takes place through backward and forward linkages.

Figure 4.1: Supplier type by firm size in 2019



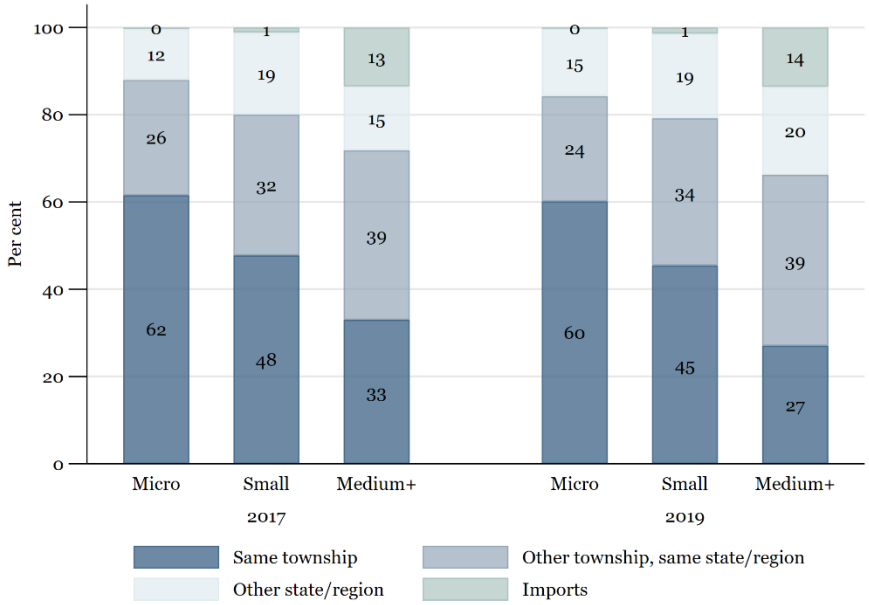
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). The question in the 2017 and 2019 surveys are different, and it is therefore not possible to compare answers in 2017 and 2019.

4.1. Sourcing characteristics

Figure 4.1 shows the share of raw materials purchased from different sources in the 2018 calendar year. Micro and small firms almost exclusive rely on inputs supplied by other domestic firms, while imported inputs make up 14 per cent of raw materials for medium+ firms. For medium+ firms, traders/distributors/retailers/wholesalers are by far the most important suppliers of raw materials, providing 43 per cent of this group's total. It is also evident form Figure 4.1 that state-owned enterprises play an important role in Myanmar's economy, supplying around 10 per cent of inputs across all size categories.

Figure 4.2 depicts the percentage of raw materials that enterprises purchased from different areas in 2018. The majority of firms report a highly localised sourcing pattern. Their supplier base is mainly located in the same township or within the same state/region. The geographical dispersion increases as firms get bigger: many medium+ enterprises seem to have established supplying networks that go beyond their state/region and country borders. It is further evident from the figure that no major changes to sourcing patterns has occurred between 2016 and 2018.

Figure 4.2: Supplier location by firm size and year

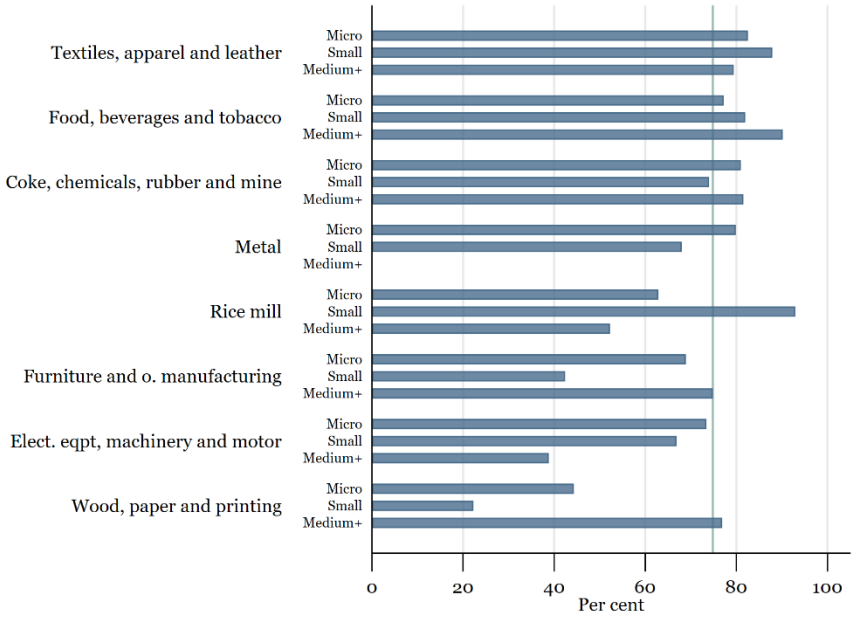


Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 4.3 gives an indication of the extent to which enterprises perceive themselves to be exposed to negative shocks in supplying sectors located upstream in the value chain. Specifically, the figure shows the percentage share of enterprises reporting that they easily could find a new supplier if their main suppliers closed down.

Large differences exist across industrial sectors. While nearly 90 per cent of firms in "Textiles, apparel and leather" would find it easy to change suppliers regardless of firm size, less than half of the micro and small firms in "Wood, paper and printing" could achieve that. In general, firm size has little bearing on this outcome across the industries in which it is not difficult to find alternative suppliers. However, when lager proportions of an industrial sector report that they could not easily find a new supplier, there is variation across firm size. Interestingly, ease of finding new suppliers is not directly related to firm size. In the "Electrical equipment, machinery and motor vehicles" industrial sector the medium+-size enterprises appear more closely linked to their current suppliers than the smaller firms. The opposite is true in the "Wood, paper and printing" industrial sector in which the medium+-sized firms appear to have no problems finding alternative suppliers, while small firms are closely linked to the current suppliers.

Figure 4.3: Availability of inputs in suppliers by industry in 2019



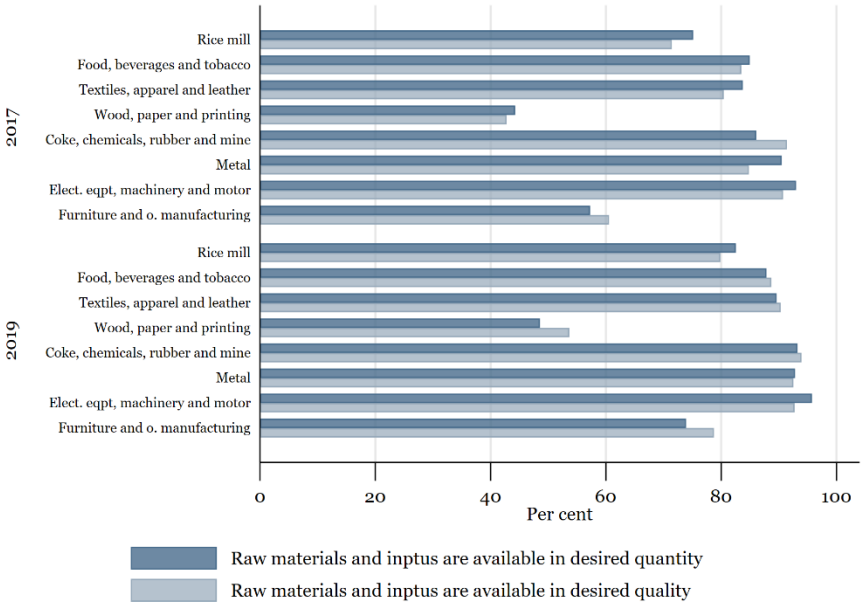
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

High-quality inputs matter for firm performance. Figures 4.4-4.6 depict whether managers and firm owners find raw materials and inputs to be available in the desired quality and quantity across industries, state/regions and firm sizes. In general, a large majority of managers and firm owners are satisfied with both the quantity (84 per cent in 2019) and the quality (84 per cent in 2019) of the inputs available. However, differences do exist across industrial sectors, states/regions as well as firm sizes.

In Figure 4.4, it is noteworthy that the fraction of firms who are satisfied with the availability of both quality and quantity of inputs has increased in all industrial sectors from 2017 to 2019. This supports the finding in section 3.3, that increased use of intermediate inputs has been an important factor in the increase in labour productivity. Second, it is evident that more than half of the firms in "Wood, paper and printing" seem to struggle to find suitable inputs and raw materials. Taken together with the results presented in Figure 4.3, it seems that this industry relies on a limited set of suppliers with inadequate capabilities or resources to serve its needs.

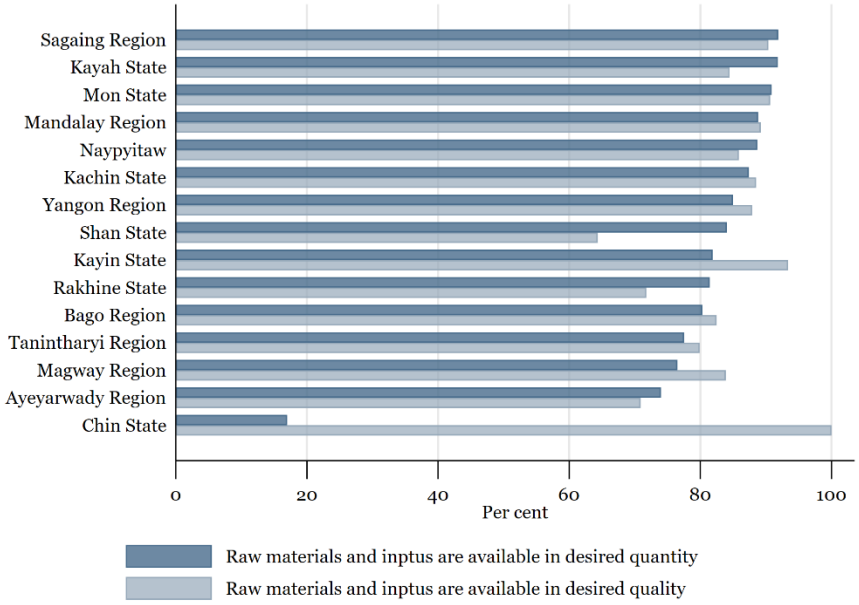
Satisfaction with the availability of inputs and raw materials also varies somewhat across states/regions. From Figure 4.5, it seems that inputs and raw materials are quantitatively scarce in Chin State, while relatively more firms report a shortage of inputs of sufficient quality in Shan State, Rakhine State and Ayeyarwady Region. Finally, Figure 4.6 replicates the statistic reported above, but along firm size categories. The satisfaction with inputs is remarkably similar across firm sizes in 2019, an outcome that comes in part as a result of the large increase in satisfaction reported by micro firm owners and managers.

Figure 4.4: Availability of inputs in desired quantity and quality by industry



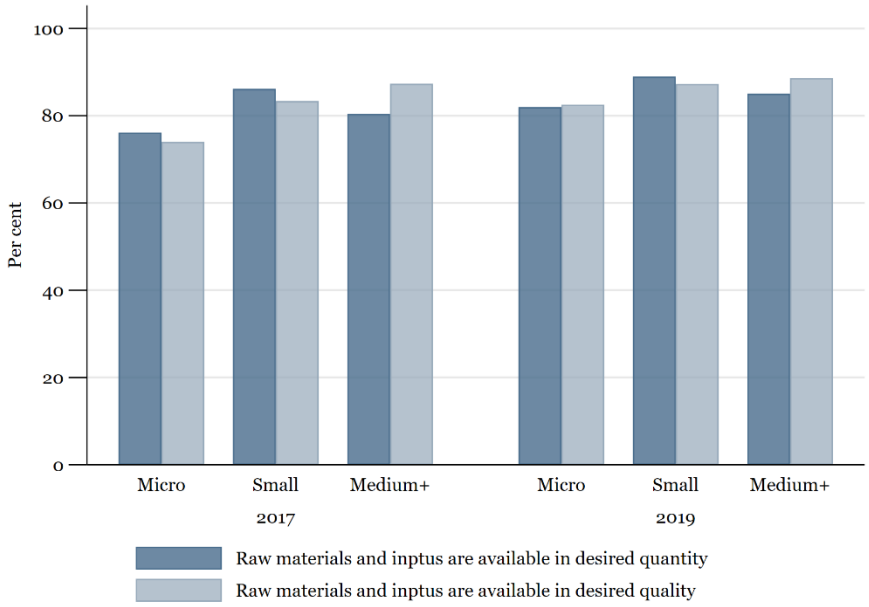
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 4.5: Availability of inputs in desired quantity and quality by state/region in 2019



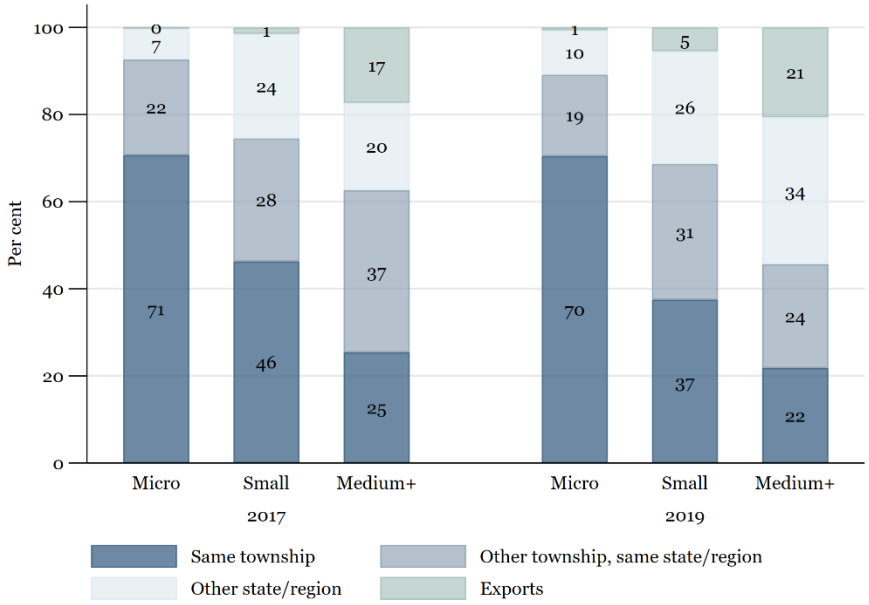
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 4.6: Availability of inputs in desired quantity and quality by firm size



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 4.7: Customer location by firm size



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

4.2. Sales characteristics

Figure 4.7 shows the location of the customers of the firm's most important product in the years before a survey. Micro firms have a highly localised customer base, selling around 70 per cent of their most important product in the same township in which they are located in both years. The local customer base deceases as a proportion of total sales as firm size increases.

For medium+ enterprises, the local townships constitute a much smaller (and decreasing) market outlet. In 2018, they sold more than half of their products outside their state/region, with 34 per cent going to firms nationally and 21 per cent being exported. The figure also reveals a slight increase in the share of exported products across all size categories. This pays testimony to the gradual and ongoing opening of Myanmar as a member of the wider international economy (Findlay, Park, and Verbiest 2016).

A diverse customer base and product portfolio can hedge against demand volatility and shocks. Table 4.1 explores the issue of customer diversification by breaking it down by firm type and size. Most firms have more than one customer. Half of all rice mills have ten customers or fewer, while nearly 25 per cent have more than 50 customers. The number of firms with 6-10, 11-20, 21-50 and 50+ customers is roughly equal among other manufacturing firms. When considering size, customer diversification is almost identical between micro and small firms, whereas medium+ firms are more diversified. Here, almost 40 per cent of firms having more than 50 customers.

Table 4.1: Number of customers by firm type and size in 2019

	Firm type		Firm size		
	Rice Mills	**All other Manuf.**	**Micro**	**Small**	**Medium+**
# of customers					
1	0.49	6.79	5.72	2.63	8.68
2-5	31.48	17.46	20.54	23.79	17.81
6-10	21.47	18.64	19.88	19.39	11.97
11-20	10.31	18.56	16.01	18.64	9.68
21-50	12.76	15.78	15.41	13.99	13.35
50+	23.49	22.77	22.44	21.56	38.51
Total	100.00	100.00	100.00	100.00	100.00

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Table 4.2 shows the distribution of firms over the number of different customers and products in 2019, where products are classified as different if they fall under an alternative MSIC4 classification. The final column of the table shows that more than half of the manufacturing firms have more than 10 different customers and 23 per cent have in excess of 50 different customers. However, the bottom row shows that more than 90 per cent of the enterprises only sell products within the same four-digit MSIC group while less than one per cent of sell products from five or more products. The main observation from the table is the positive association between the number of product categories and the number of customers. Firms with many product categories are more likely to have several customers than firms with few product categories are.

Table 4.2: Distribution of products and customers in 2019

	Product categories						
# of customers	**1**	**2**	**3**	**4**	**5**	**5+**	**Total**
1	4.93	0.00	0.20	0.00	0.00	0.00	5.12
2-5	20.34	0.46	0.23	0.24	0.00	0.00	21.27
6-10	17.95	0.27	0.87	0.13	0.08	0.03	19.34
11-20	15.15	0.45	0.39	0.23	0.10	0.08	16.39
21-50	13.49	0.90	0.34	0.07	0.00	0.15	14.95
50+	20.29	1.20	0.70	0.37	0.13	0.24	22.92
Total	92.15	3.27	2.74	1.04	0.30	0.50	100.00

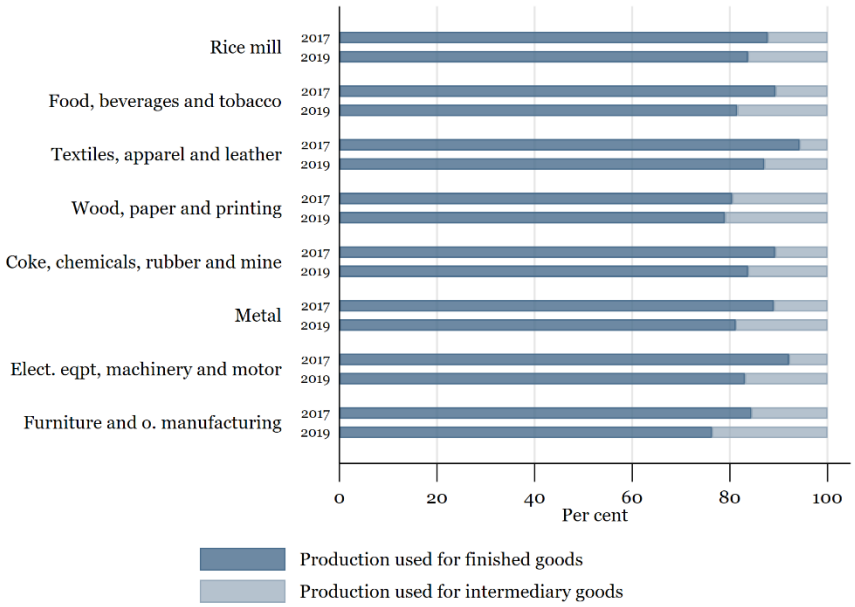
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 4.8 gives an indication of the extent to which firms in different industries are suppliers in longer value chains. It provides a per-industry break down of the average percentage of firm

output sold as final and intermediary goods. A priori, one would expect that upstream industries (for example "Textiles, apparel and leather" and "Wood, paper and printing") sell relatively more intermediary goods, while industries downstream (for instance "Electrical equipment, machinery and motor vehicles") produce more final goods. From the patterns seen in Figure 4.8, we do not observe this as the split between final and intermediary goods sold is fairly similar across industries.

Moreover, there is an increasing share of goods in all industrial sectors from 2017 to 2019 being sold as intermediate goods. The rising share of intermediary outputs may indicate that stronger value chains are starting to take hold in the economy. This could be a consequence of a higher level of specialisation and inter-industry linkages. Thus, the figure may indicate that structural changes are occurring in the manufacturing sector.

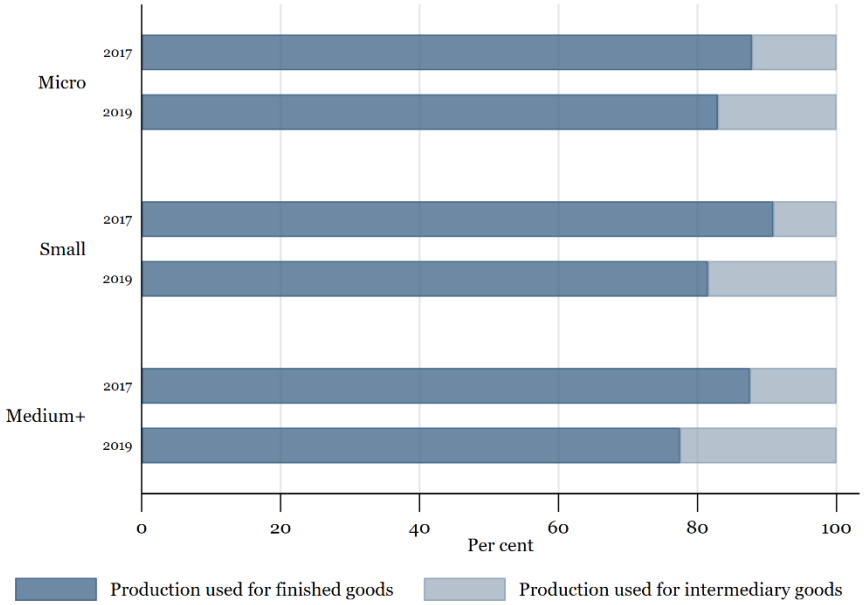
Figure 4.8: Share of production for finished and intermediary goods by industry and year



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

From Figure 4.9, it can be seen that the increase in production of intermediate inputs is driven primarily by small and medium+ enterprises. Larger firms, which may have the resources to produce high-quality inputs, may therefore prove to be important for deepening the input-output structures and further integrating the manufacturing sector into global value chains.

Figure 4.9: Share of production for finished and intermediary goods by firm size, age and year



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

4.3. Learning through input-output linkages

Participation in value-chains holds a learning potential for manufacturing firms, which possibly facilitates the upgrading of products, production processes, and productivity. This can happen in several ways. On one hand, firms sourcing from suppliers upstream can learn through technologies embedded in their inputs, benefit from additional services accompanying those sales or receive technology transfers. On the other hand, firms can learn by selling products downstream to manufacturers. For instance, buyers have an incentive to help their suppliers upgrade the quality of their inputs through technology and knowledge transfers. The simple demand for high quality inputs may also incentivise suppliers to upgrade their products in the fight for new customers. This mechanism is potentially important as 57 per cent of enterprises report that the most important criteria for selecting suppliers is the quality of their products, a figure that far exceeds other factors such as competitive prices (6 per cent), secure supplies (23 per cent), and personal ties (5 per cent).

Table 4.3 displays the percentage of firms in 2019 reporting that the relationship to their customers (suppliers) ever required special or additional investments in production and the percentage of firms reporting that they have received a technology transfer from any of their customers (suppliers) at some point. Suppliers and customers seem equally likely to push enterprises to undertake special or additional investments in production (29.6 compared with 29.3 per cent). Yet, there is a significantly higher probability that a firm have received technology transfers from a supplier compared to a customer (6.8 compared to 16.1 per cent). A particularly high frequency of firms in "Textiles apparel and leather" and "Electrical equipment, machinery and motor vehicles" are exposed to investment demands and technology transfers from customers and supplier. For instance, 44 per cent of firms in "Textiles apparel and leather" have undertaken supplier-induced investment at some point, while customer relations have induced 39 per cent of firms to make new investments. Additionally, one in three

firms have received a technology transfer from a supplier and nearly 9 per cent have received a transfer from a customer.

Table 4.3: Investment and technology transfers due to customer and supplier relations (per cent)

	Customers relations leading to:		Supplier relations leading to:	
Industries	Investments in production	Technology transfer	Investments in production	Technology transfer
Rice mill	33.13	8.34	25.54	10.97
Food beverages and tobacco	24.81	4.22	27.23	15.03
Textiles apparel and leather	38.82	8.54	43.68	33.05
Wood paper and printing	25.10	6.74	36.00	19.87
Coke chemicals rubber and minerals	29.97	5.75	28.93	17.57
Metal	24.86	6.91	24.19	10.90
Elect. eqpt machinery and vehicles	40.03	15.72	36.22	26.52
Furniture and other manufacturing	29.58	5.37	32.86	18.10
Total	29.62	6.80	29.55	16.51

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Do the customer/supplier-induced investments and technology transfers result in a detectable increase in labour productivity? This issue is investigated in Table 4.4. The table shows regressions for labour productivity, controlling for the number of full-time employees, capital per employee, and intermediary inputs per employee. In addition, the regressions include fixed effects for year, industry, state/region, and the interaction of industry and state/region. Columns 2 and 3 of Table 4.4 further include two indicator variables taking the value of one, if a firm reports to have made customer-induced investments or received a technology transfer from a *customer*. Reception of a technology transfer is conditional on firms having made customer-induced investments and 21 per cent of the firms that made such investments report having received a technology transfer. Columns 4 and 5 include indicators for whether a firm have ever invested or received a technology transfer due to its relationship with a *supplier*. As for the customer relation, firms that have received a technology transfer are a subset of the firms that have ever invested due to their relationship with a supplier. Almost 60 per cent of the firms for which their supplier relations required an investment reported to have received a technology transfer.

Column 2 show that firms making special investments in production due to their relationship with customers have higher labour productivity than their peers. Specifically, firms that are induced to invest by a customer have, on average at 17 per cent higher labour productivity compared to other firms. In contrast, as seen from column 3, there is no significant difference in labour productivity when focussing on the smaller group of firms that received a technology transfer.

Turning to the supplier-induced investments in column 4, the result is very similar to the customer-induced investments showing an average higher labour productivity of about 14.5 per cent, whereas the effect of a direct technology transfer from the supplier is also statistically insignificant, as seen from column 5. Jointly, the two sets of regressions illustrate that both customer- and supplier-induced investments are associated with statistically and economically significant increases in labour productivity. However, the results presented in Table 4.4 are not necessarily the causal effects of the customer and supplier relations, as the regressions do not take account of selection and matching of firm relations.

Table 4.4: Productivity spillovers due to customer and supplier relations

	(1)	(2)	(3)	(4)	(5)
Full-time employees (ln)	0.058***	0.049***	0.056***	0.050***	0.054***
	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)
Capital per employee (ln)	0.081***	0.082***	0.081***	0.081***	0.081***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Intermediate inputs per employee (ln)	0.716***	0.713***	0.716***	0.713***	0.715***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Customer induced investments in production		0.159***			
		(0.059)			
Technology transfer from customer			0.100		
			(0.091)		
Supplier induced investments in production				0.135**	
				(0.062)	
Technology transfer from supplier					0.071
					(0.040)
Constant	0.892***	0.909***	0.895***	0.896***	0.892***
	(0.110)	(0.111)	(0.111)	(0.113)	(0.111)
Observations	3,942	3,942	3,942	3,942	3,942
R-squared	0.835	0.837	0.836	0.837	0.836

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Notes: Dependent variable is the log of revenue per full-time employee. Regressions include industry, region/state, industry-region/state, and year fixed effects. Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Numbers in million Kyats. 98% Winsorization applied to revenue, capital and intermediary inputs variables, which are in constant 2018 prices. Standard errors in parentheses are robust. The asterisks indicate statistical significance of the estimated parameters at different levels of significance: *** p<0.01, ** p<0.05.

4.4. Closing Reflections

This chapter has drawn a picture of a manufacturing sector with a sparsely developed input-output structure. Most firms report highly local source and supply patterns. Only medium and large firms appear to have the capabilities to extend their operations beyond country borders and less than 20 per cent of total output in the manufacturing sector is supplied as intermediary products in value chains. The good news is that the fraction has increased slightly from 2017 to 2019. It is also encouraging that the majority of firms do not face input constraints. However, differences exist across industries and states/regions.

Finally, it is a well-established fact that firms can learn through their relations with customers and suppliers. The analysis provided here show signs of learning effects, flowing in both directions from customers to suppliers and from suppliers to customers.

5. Investment and access to finance

The descriptive report for the 2017 Myanmar Micro, Small and Medium Enterprise survey (CSO and UNU-WIDER 2018) was interested in communicating, amongst other issues, the extent to which firms in the manufacturing sector were able to invest, the focus of that investment and access to both formal and informal sources of credit to finance such investments. It took as its point of departure that improved access to credit was the commonest response when firm owners/managers reflected on how the Myanmar government could assist and a feeling amongst business owners that investment could bring about better business conditions and growth for their firms. Given the ongoing complaints of some firms that finance is still not widely available (see Chapter 7), it is timely to return to those themes.

5.1. Investment

Table 5.1 compares the percentage of firms that made investments in the two years immediately up to participating in the surveys in 2017 and 2019. This information is broken down by size and industrial sector. Investment decisions of firms operating in both Yangon and Mandalay, the country's two major business cities, are also presented.

Table 5.1: Share of firms making new investments (per cent)

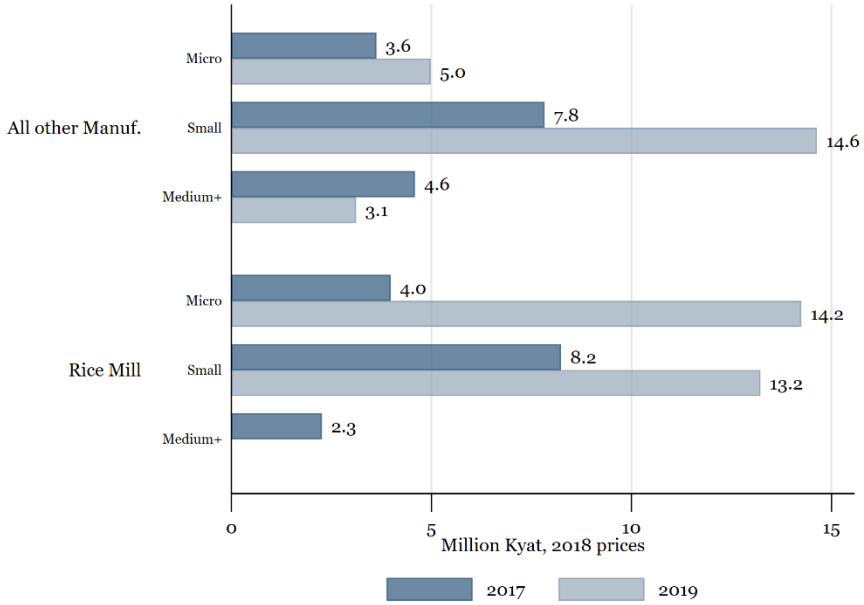
	2017	2019	Tigers 2019		2017	2019	Tigers 2019
Firm size				*Industries*			
Micro	27.2	9.7	2.9	Rice Mills	39.6	16.3	2.9
Small	36.2	17.1	10.9	All Other Manufacturing	25.1	9.6	8.3
Medium+	19.9	8.2	21.1	Food, beverages and tobacco	19.4	10.4	5.1
				Textiles, apparel and leather	22.3	7.0	9.3
Location				Wood, paper and printing	29.1	8.6	11.5
Yangon	11.5	12.2	15.7	Coke, chemicals, rubber and minerals	26.8	7.9	3.3
Mandalay	27.6	2.7	0.0	Metal	39.4	7.0	49.0
				Elect. eqpt, machinery and vehicles	38.2	12.6	0.0
All	28.8	11.4	5.0	Furniture and other manufacturing	23.9	14.0	0.0

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

The first result to note is the substantial decline in the share of firms investing. In 2017, 29 per cent made new investments as compared to only 11 percent in 2019. At the level of the industrial sectors, "Rice mills" are the most likely to invest in both years of the survey, but that is not to say that it too has not seen a sharp decline in investment. Furthermore, the percentage of firms making new investments in the two years prior to 2019 is lower than in 2017 in each size category, with a proportion of less than half the 2017 figure in all of cases. An extreme case is found in Mandalay Region, where the proportion of firms making investments declined by almost 90 per cent. At the industrial sector level, investment in firms producing "Metal" also saw a sharp decline in investment, in this case by more than 32 percentage points.

The present chapter includes a few statistics about investment decisions of the Tiger firms, as identified in Chapter 2, in the two years leading up to the 2019 survey. Investment decisions are varied across categories when considering this special group of firms. Generally, the Tigers invested less than the rest of the cohort in which they are placed. For example, Tigers amongst "Rice mills" were more than 80 per cent less likely to make an investment. Conversely, medium+ sized Tigers invested approximately 2.5 times more than non-Tigers. There were no investing Tigers in Mandalay or in the production of "Electrical equipment, machinery and motor vehicles" and "Furniture and other manufacturing ".

Figure 5.1: Average amount invested per full-time worker in 2017 and 2019, by firm type and size



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

As seen in Figure 5.1 the decrease in the share of firms making investments has occurred alongside an increase in the amounts invested. In particular, micro and small firms invest larger amounts in 2019 compared to 2017. The overall outcome of the decrease in the fraction of firms investing and the increase in the amounts invested is that the total estimated investment amount has only decreased by 34 billion Kyats between the two years, from 583 billion Kyats in 2017 to 549 billion Kyats in 2019, both in 2018 prices.

Table 5.2: Reason for new investment (per cent)

	2017	2019
Add to capacity	42.50	64.27
Replace old equipment	13.00	8.02
Improve productivity	18.83	12.02
Improve quality of output	20.77	15.68
Produce new output	1.77	0.00
Safety	0.70	0.00
Environmental requirements	0.61	0.00
Other	1.82	0.00

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Table 5.2 shows the distribution of the reasons firm representatives gave for choosing to make new investments. Whilst increasing production capacity is the most common answer in both 2017 and 2019, there has in fact been a large increase in the proportion of firms giving this explanation (from around two in five investing firms to more than 60 per cent). There has been a decline in the combined percentage of firms investing to either improve productivity or the overall quality of the product they sell by 30 per cent and investment decisions to replace old equipment has declined by around 5 percentage points. Although they accounted for a collective total of just 5 per cent in 2017, there were no firms reporting their investment decisions were driven by a need to improve safety in their production facilities, to fulfil environmental requirements or for any other reason in the 2019 survey.

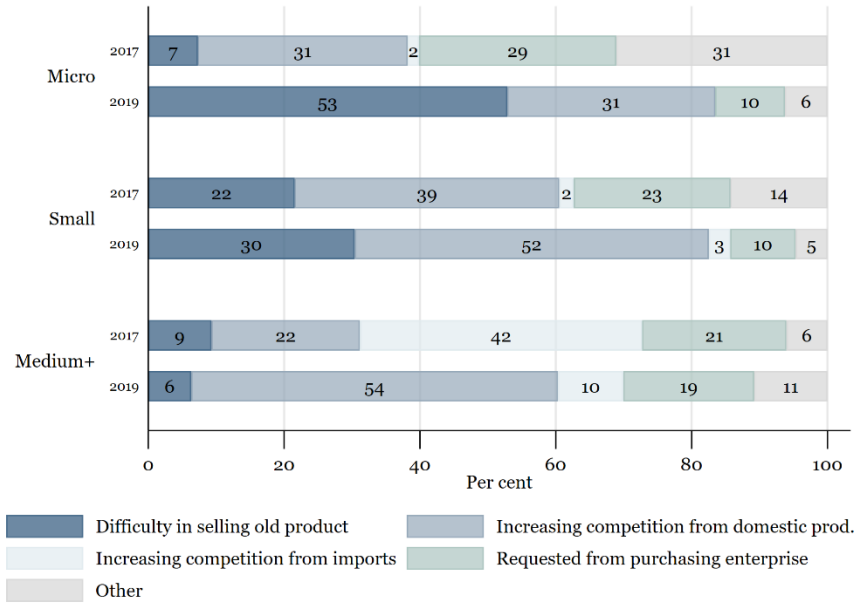
Table 5.3: Investments in improving existing products (per cent)

	2017	2019		2017	2019
Firm size			*Industries*		
Micro	12.38	1.97	Rice Mills	17.58	7.59
Small	15.31	7.64	All Other Manufacturing	11.48	2.25
Medium+	12.21	9.23	Food, beverages and tobacco	11.28	2.63
			Textiles, apparel and leather	5.29	2.84
Location			Wood, paper and printing	6.18	0.44
Yangon	3.97	11.69	Coke, chemicals, rubber and minerals	13.47	2.45
Mandalay	10.97	0.24	Metal	12.80	0.61
			Elect. eqpt, machinery and vehicles	24.07	2.72
All	13.01	3.68	Furniture and other manufacturing	15.37	3.29

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Table 5.3 shows the percentage of firms that chose to invest in improving their existing products over the two stages of the survey. There is a large decline in this investment decision in 2019, with only 3.7 per cent of firms choosing to invest in improving the items they already produced between 2017 and 2019. Moreover, in each of the categories given in the table, there is a decline in investment in existing products except for in Yangon, where almost three times as many firms invested in improving existing products in 2019 as did in 2017. At the most extreme level, the percentage of firms investing in 2019 declined by more than 95 per cent in the "Metal" sector, with fewer than one in every hundred firms choosing to invest in the two years leading up to the 2019 study.

Figure 5.2: Reasons for investing in existing products



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

It is worth noting that about 1.1 per cent of firms chose to both introduce new products and invest in existing products, which is substantially smaller than the 2.8 per cent of firms only investing in new products and more the more than 2.6 per cent of firms only investing in existing product lines.

The reasons that firms gave for investing in existing productions in the two years leading up to the surveys were varied both across firm size and over the two years as indicated in Figure 5.2. In 2019, the majority of small and medium+ firms refer to increasing competition from domestic producers, while the majority of micro firms refer to difficulties in selling their product.

Table 5.4 depicts changes to how new investments were funded over the two cycles of the study. Investing retained profit and personal capital is the way that the majority of firm owners/managers invest. There was a reasonably large increase of more than 3 percentage points of investments being financed in this way. The percentage of new investments being financed through bank borrowing also increased from 11.3 to 17.5 per cent over the two years. This partially offsets the decline in firms investing funds sourced from other formal providers. Other streams of funding also declined, with informal sources of finance requiring the payment of interest accounting for 2.3 per cent in 2019 and informal sources not requiring interest payments declining to zero.

Table 5.4: How was the investment financed (per cent)

	2017	2019
Own capital	73.04	76.70
Borrowed from bank/credit institution	11.26	17.51
Borrowed from other formal sources	8.06	3.48
Borrowed from friends or relatives (with interest)	5.41	2.31
Borrowed from friends or relatives (without interest)	0.73	0.00
Other	1.50	0.00

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

5.2. Credit and debt

Much has been made of efforts to increase the ease with which firms can access credit from a formal institution. Table 5.5 presents data on the percentage of firms that have applied for formal credit in both 2017 (top) and 2019 (bottom). For firms that obtained formal credit, both the proportion that faced problems as well as the problems they faced are given in the left-hand side of the table. For firms that obtained credit, the percentage of firms that were rationed by not securing a loan for their desired amount is also presented. Further, data on the reasons that firms chose not to apply for a loan are given in the right-hand side of the table. Finally, data on which firms have both formal and informal debt are given in the bottom parts of the table. The table identifies the fractions of firms that faced problems in obtaining a loan, firms that obtained loans without a problem, and firms that did not apply for a loan.

The table shows a slight decline in the proportion of firms that applied for a loan between 2017 and 2019. However, the proportion of those firms that faced a problem in their application simultaneously decreased slightly. Interestingly, the firms that obtained a loan in 2019 are less likely to be rationed than two years earlier.

The most pertinent change in terms of problems faced is the increase in loan applicants complaining of complicated regulations, which more than doubled to 72 per cent and the percentage of firms unable to put up adequate collateral increasing to more than 10 per cent. This offset the sharp decline in firms explaining they faced problems for "other" reasons.

Table 5.5: Share of firms with formal credit and limits to credit

2017						
	YES				NO	
Applied for a loan	9.55				90.45	
	YES		NO			
Problems getting a loan	24.54		75.46		*Reason for not applying*	
			YES	NO	Inadequate collateral	5.87
Rationed			100.00	0.00	Do not want to incur debt	42.44
Reason for problem					Application procedures too complex	16.96
Collateral/co-signers unacceptable	4.64				No need for loan	20.71
Insufficient business description	15.05				Interest rates too high	1.87
Complicated regulations	35.17				Already heavily indebted	1.74
Administrative issues	6.83				Other	10.41
Other	38.31					
	YES	NO	YES	NO	YES	NO
Has formal debt	9.48	90.52	83.70	16.30	4.08	95.92
Has informal debt	5.44	94.56	4.31	95.69	6.87	93.13
2019						
	YES				NO	
Applied for a loan	7.12				92.88	
	YES		NO			
Problems getting a loan	22.33		77.67		*Reason for not applying*	
			YES	NO	Inadequate collateral	3.35
Rationed			92.97	7.03	Do not want to incur debt	0.00
Reason for problem					Application procedures too complex	30.42
Collateral/co-signers unacceptable	10.60				No need for loan	42.99
Insufficient business description	0.00				Interest rates too high	4.46
Complicated regulations	72.17				Already heavily indebted	1.20
Administrative issues	11.09				Other	17.57
Other	6.15					
	YES	NO	YES	NO	YES	NO
Has formal debt	67.50	32.50	82.73	17.27	4.22	95.78
Has informal debt	12.93	87.07	11.56	88.44	2.97	97.03

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

The most common reason why firms did not apply for a loan changed from the owner not wanting to incur debt in 2017 (42 per cent) to the owner not believing they needed a loan in 2019 (43 per cent). In fact, no firm reported that they did not want to incur debt in 2019, while the proportion of firms not needing a loan more than doubled over the two years. Likewise, the proportion of firms not applying for a loan due to a complicated application procedure also doubled from one-in-six to one-in-three.

In both years of the study, it is unsurprising to see that firms that did not apply for a loan have limited formal or informal debt in either phase. Similarly, firms that apply for loans have an increased level of formal debt but are also more likely to be indebted to informal sources. It is finally worthy to note that the percentage of firms with debt that faced problems getting a loan have increased substantially over the two years.

In Table 5.6, loan applications are broken down into the categories previously used, with the fraction of Tigers applying for loans in 2019 also given for each category. The overall decline in applications between the two phases is backed up by a reduction in both "Rice mills" and "All other manufacturing". The decline also takes place at all levels of firm size and amongst almost all industries, with the exception of firms manufacturing in the "Wood, paper and printing" and the "Coke, chemicals, rubber and minerals" industries, where there was an increase. Tiger firms applied less commonly than their non-Tiger counterparts did, though this was offset by a particularly high proportion of Tiger "Rice mills" making an application. As can be seen, there are a number of categories where no Tigers applied for a loan, and others with substantially lower proportions applying than the categorical average.

Table 5.6: Loan applications by category and amongst Tigers

	2017	2019	2019 Tiger		2017	2019	2019 Tiger
Firm size				*Industries*			
Micro	6.44	4.47	2.45	Rice Mills	13.57	6.52	15.82
Small	19.36	14.15	46.41	All Other Manufacturing	8.20	7.33	4.75
Medium+	11.82	10.99	0.00	Food, beverages and tobacco	9.46	7.73	7.42
				Textiles, apparel and leather	8.73	7.81	0.00
Location				Wood, paper and printing	4.81	6.07	4.64
Yangon	5.10	7.69	5.12	Coke, chemicals, rubber and minerals	3.09	7.08	3.29
Mandalay	9.29	5.20	0.00	Metal	6.68	5.18	0.00
				Elect. eqpt, machinery and vehicles	12.52	5.63	0.00
All	9.55	7.12	11.58	Furniture and other manufacturing	10.93	10.88	0.00

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

To consider the issue of loan applications further, the proportion of firms applying for loans across each of our size categories, key business hubs and industrial sectors is provided in Table 5.7. For each category, the loan applications are considered by year and separated into applicants based in one of the country's industrial zones and those not based within such a designated area.

Across the whole country, firms were approximately 50 per cent more likely to apply for a loan if they were based in an industrial zone in both years of the study. Interestingly, small firms are more likely to apply for a loan outside of the zone in both phases, whilst medium+ firms have similar application rates both inside and outside of a zone.

Table 5.7: Loan applications by firms inside and outside of industrial zones (per cent)

	2017		2019			2017		2019	
	Zone	No zone	Zone	No zone		Zone	No zone	Zone	No zone
Firm size					*Industries*				
Micro	13.80	5.45	8.74	4.00	Rice Mills	9.67	14.12	5.98	6.57
Small	13.32	21.78	10.80	15.15	All Other Manufacturing	14.02	6.74	10.64	6.62
Medium+	11.83	11.82	11.33	10.54	Food, beverages and tobacco	12.80	8.30	12.34	6.41
					Textiles, apparel and leather	23.69	5.85	14.59	6.57
Location					Wood, paper and printing	8.69	4.36	5.91	6.08
Yangon	6.39	2.95	10.04	4.47	Coke, chemicals, rubber and minerals	7.56	2.21	2.68	7.78
Mandalay	17.86	8.07	0.00	5.85	Metal	22.66	4.04	10.25	4.27
					Elect. eqpt, machinery and vehicles	16.63	10.40	8.52	4.29
All	13.28	8.73	9.94	6.61	Furniture and other manufacturing	2.90	11.65	0.00	11.42

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

When considering the various industrial sectors, the picture varies. For example, "Rice mills" and "Furniture and other manufacturing" firms located outside an industrial zone are more likely to apply for a loan. Between the two survey rounds, there is an important change within the "Textiles, apparel and leather", "Wood, paper and printing", "Coke, chemicals, rubber and minerals" and "Metal" industries in that firms in industrial zones were more likely to apply for loans in 2017, whilst a bigger proportion outside of a zone applied in 2019.

For each category, the mean value of formal loans and their interest rates is presented in Table 5.8. Across all manufacturing firms, the average amount borrowed increased by approximately 30 per cent to 188 million Kyats in 2018 prices, a figure of around USD 120,000.

Table 5.8: Mean formal loan (million Kyats, 2018 prices) and mean monthly interest rate (per cent)

	2017		2019			2017		2019	
	Mean loan	Mean interest rate	Mean loan	Mean interest rate		Mean loan	Mean interest rate	Mean loan	Mean interest rate
Firm size					*Industries*				
Micro	52.62	1.20	95.70	1.29	Rice Mills	146.29	1.21	113.86	1.00
Small	113.43	1.19	158.52	1.08	All Other Manuf.	139.56	1.19	212.98	1.23
Medium+	825.62	1.24	926.98	1.03	Food, beverages and tobacco	193.57	1.19	343.16	1.14
					Textiles, apparel and leather	97.74	1.20	169.56	1.18
Location					Wood, paper and printing	61.14	1.41	75.77	1.67
Yangon	497.53	1.27	664.75	1.09	Coke, chemicals, rubber and minerals	63.18	1.17	24.09	1.02
Mandalay	127.97	1.12	286.04	0.98	Metal	24.32	1.22	182.55	1.24
					Elect. eqpt, machinery and vehicles	62.12	1.07	52.45	1.18
All	141.82	1.20	187.65	1.17	Furniture and other manufacturing	43.13	1.14	27.98	1.44

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

A general trend was an increase in the size of borrowing where formal loans were offered, with firms employing fewer than ten people almost doubling the average size of their loan. In key business hubs there was also an increase. Although this more than doubled in Mandalay, the comparatively smaller increase in Yangon still represents an average loan size that is twice the size of the country's second biggest city.

Separating manufacturing by product groups, we note there has been a similar general trend in increased loan size. However, this is not true universally as producers of "Coke, chemicals, rubber and minerals" borrowed about a third of what they had done in 2017. Comparatively smaller declines were also recorded amongst firms in the "Electrical equipment, machinery and motor vehicles" and "Furniture and other manufacturing" industries.

Generally speaking, monthly interest rates remained reasonably consistent, with an overall change of 3 basis points from 2017 to 2019. In Yangon, there was a comparatively larger decline in monthly interest rates of 18 basis points. Conversely, firms producing "Wood, paper and printing" items saw monthly rates increase by an average of 26 basis points. Changes to interest rates do not appear to track changes to mean borrowing in that some increased borrowing is met with either lower or higher monthly rates across our categories.

As seen in Table 5.5, borrowing was not restricted to formal sources and Table 5.9 replicates the previous table for the average size of informal borrowing and their corresponding mean interest rates. Borrowing from family and friends that did not attract interest is excluded from this analysis. The average amount borrowed in 2019 is 22.6 million Kyats (approximately USD 15,000). In both phases, the average amount borrowed is substantially lower in each category than that group borrowed formally.

Although there were modest increases in micro firm borrowing between 2017 and 2019, small firms more than trebled their borrowing to 46.0 million Kyats over the same period. Medium+ firms borrowed much less in 2019, decreasing their average loan size by more than 80 per cent to just 24.2 million Kyats. This in part affected the average borrowing in Yangon, which experienced a big decline in informal borrowing.

Producers of "Food, beverages and tobacco" items continued to be the biggest borrowers from informal sources, increasing their average loan sizes to 67.8 million Kyats. Loans provided to "Coke, chemicals, rubber and minerals" producers were also sizeable in 2019.

Table 5.9: Mean informal loan (million Kyats, 2018 prices) and mean monthly interest rate (per cent)

	2017		2019			2017		2019	
	Mean loan	Mean interest rate	Mean loan	Mean interest rate		Mean loan	Mean interest rate	Mean loan	Mean interest rate
Firm size					*Industries*				
Micro	6.05	3.68	9.68	3.50	Rice Mills	3.92	3.85	12.02	2.57
Small	13.07	3.36	46.01	2.95	All Other Manufacturing	12.96	3.54	27.54	3.58
Medium+	158.12	3.26	24.22	2.00	Food, beverages and tobacco	21.77	3.25	67.77	2.74
					Textiles, apparel and leather	7.85	2.34	7.14	3.93
Location					Wood, paper and printing	10.79	3.32	8.89	3.97
Yangon	182.91	2.19	14.04	4.97	Coke, chemicals, rubber and minerals	9.45	3.66	34.83	3.47
Mandalay	9.50	1.99	1.08	2.50	Metal	12.85	4.07	9.93	1.59
					Elect. eqpt, machinery and vehicles	6.61	6.16	4.25	3.57
All	10.99	3.62	22.56	3.26	Furniture and other manufacturing	3.71	3.02	6.00	5.43

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Excludes informal loans offered without interest.

It remains an important issue that interest rates paid to informal lenders is substantially larger than the rates paid to formal financiers. Many firms perceive inadequate access to formal credit as a major barrier to growth and the very high interest rates they face, as they turn to alternatives likely explains this frustration.

Table 5.10: Debt Incidence (per cent)

	2017	2019		2017	2019
Firm size			*Industries*		
Micro	14.82	8.59	Rice Mills	23.95	13.18
Small	20.33	21.81	All Other Manufacturing	13.32	11.91
Medium+	14.01	18.51	Food, beverages and tobacco	12.80	12.35
			Textiles, apparel and leather	18.38	10.50
Location			Wood, paper and printing	13.41	13.60
Yangon	7.39	13.49	Coke, chemicals, rubber and minerals	11.51	9.80
Mandalay	17.28	5.47	Metal	8.19	7.14
			Elect. eqpt, machinery and vehicles	14.09	9.61
All	15.99	12.25	Furniture and other manufacturing	17.99	20.64

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Finally, turning from loans obtained directly up to the survey rounds, Table 5.10 provides data on debt incidence across the two rounds. The information about debt is derived directly by asking the firm owners or managers whether they have either formal or informal debt and all firms that acknowledge that at least some of their current liabilities take this form are registered as having debt.

Whilst there is a lot of similarity between the two years, some outcomes are worthy of note. First is the increase in debt incidence amongst the medium+ sized firms. This goes hand in hand with the increase in the estimated total investment for this group of firms. Total investment in medium and large firms was 74 billion Kyats in 2017 while it increased to 94 billion Kyats in 2019, both in 2018 prices.

5.3. Formal debt and investment

The descriptive report for the 2017 Myanmar Micro, Small and Medium Enterprise survey analysed determinants of debt incidence. An important finding was how firms that made investments were more likely to have both formal and informal debt (CSO and UNU-WIDER 2018). However, there was no attempt to look at the causal relationship between investment and formal loans. In this section, a statistical analysis of the causal link from formal debt to

the probability of firms' investing is presented. Estimating the size of the causal link from formal debt to investments is important because it is often implicitly assumed that if more firms get access to formal credit this will give rise to higher investment rates. This, however, cannot be concluded from the results above, or from the regressions presented in CSO and UNU-WIDER (2018, Table 7.7). It is, in fact, quite difficult to estimate the causal relationship because of the special characteristics of firms in terms of both credit and investments.

Table 5.11 shows the percentage of firms that made investments in the two years immediately up to participating in the surveys in 2017 and 2019, based on the same information as in Table 5.1. However, in Table 5.11, the information is broken down by information about whether the firm had formal debt or not in the same years. Furthermore, the results are reported for the sample without the use of sampling weights. The reason for reporting unweighted averages is that the causal link from formal debt to investment will be estimated using sample matching and analytic weighs.

Table 5.11: The impact of formal debt on the probability of investment

	2017		2019		DiD 2019	
Proportion of firms that invested (per cent)	**Full sample (1)**	**Matched sample (2)**	**Full sample (3)**	**Matched sample (4)**	**Full sample (5)**	**Matched sample (6)**
Firms with formal debt	55.4	54.1	30.9	31.4	21.2	22.9
	(3.9)	(4.1)	(3.3)	(3.5)	(3.9)	(4.3)
Firms with no formal debt	20.1	21.5	8.9	12.5	7.7	7.7
	(0.9)	(1.5)	(0.7)	(1.1)	(0.7)	(1.2)
Difference	35.3*	32.5*	22.0*	18.9*	13.6*	15.2*
	(4.0)	(4.7)	(3.4)	(4.0)	(3.9)	(4.5)
Conditional difference		30.8*		18.2*		13.7*
		(4.5)		(3.6)		(4.2)
Number of firms with formal debt	166	148	194	172	113	96
Number of firms with no formal debt	1,805	778	1,777	857	1,329	488
Number of matched strata		92		106		70

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: The full sample in column (5) is the sample of firms that reported not to have formal debt and not have invested in the 2017 survey round. The matched samples are based on the full samples of firms given in columns (1), (3) and (5). The variables used to create the matched samples are (i) the number of full-time employed, (ii) the production sector (MSIC 4 code), (iii) the location of the firm (State/Region), and (iv) the sex of the survey respondent (the owner or manager). The matching is made using coarsened exact matching. The asterisks indicate statistical significance of the mean differences at different levels of significance: '*' indicates that the difference is significant at the 1 per cent level.

Column (1) in Table 5.11 shows how 55.4 per cent of the 166 firms that had formal debt also made investments at some point during the two years prior to the 2017 survey round. In contrast, only 20.1 per cent of the 1805 firms that did not have formal debt made such investments. The difference in the investment rates of 35.3 percentage points is clearly significant at the 1 per cent level of significant. This, however, does not imply that increasing access to credit will increase the share of firms that invest. As seen from the descriptive statistics above, there are strong composition effects in terms of the firms' size, sector and location when it comes to both formal debt and investment.

To take account of the composition effect, the samples of firms with and without formal debt are matched on firm size (the number of full time employed, in logs), the production sector (MSIC 4 level), the location of the firm (State/Region) and the sex of the survey respondent (the owner or manager). These variables have been shown to correlate with both the firms' debt position and their investment.[4] The matching of the two samples is performed using coarsened exact matching. The matching reduces the samples to 148 firms with formal debt

[4] See Hansen, Rand, Tarp and Trifkovic (2019).

and 778 firms with no formal debt. The 926 firms are matched in 92 different strata that are given different weights to ensure balance when comparing means.

The weighted investment rates for the two groups of firms, based on the matched samples for 2017 are given in column (2) of Table 5.11. As is clear from the table, matched sample averages are quite close to the full sample averages in column (1), and the difference of 32.5 percentage points is clearly statistically significant. In addition to the difference in the weighted investment ratios, a (weighted) conditional difference is also reported. The conditional difference is based on a weighted least squares regression, using the stratum weights from the matching and conditioning on the four sets of correlates that are also included in the matching. Thus, the conditional difference has both parametric and non-parametric adjustment for observable confounders.

Columns (3) and (4) in Table 5.11 repeats the comparison procedure using the information from the 2019 survey round. As also noted above, the investment rates are significantly smaller in 2019 compared to 2017 and the decrease is such that the difference between firms with and without formal debt is less pronounced in 2019, though it is still statistically significant at the 1 per cent level of significance, both for the full sample and the matched sample comparisons. However, for the matched sample the conditional difference of 18.2 percentage points in 2019 is only about half of the full sample difference in 2017. Thus, the simple comparison based on the 2017 samples appears to be a very high estimate of possible future effects of access to credit on investment behaviour.

A better estimate of future effects of access to credit may be established by another non-parametric adjustment, which is given in columns (5) and (6) in Table 5.11. Here, the samples of firms are restricted even further to include only firms that reported to have neither formal debt nor investment in the 2017 survey round. Of these only 1442 firms, 113 reported to have formal debt in 2019 while the remaining 1329 reported they had no formal debt. The investment rate for the firms who had formal debt in 2019 but not in 2017 (reported in column (5)) is much lower than the rate for the full sample of such firms, reported in column (3) while there is a smaller drop in the investment rate for the firms with no formal debt in both years. The resulting difference of 13.6 percentage points is still statistically significant, but it is quite a bit lower than the full sample differences in 2017 and 2019. Finally, the matched samples of firms with no formal debt and no investments in 2017 give results that are very similar.

Overall, the statistical analysis if the effect of formal debt on investment behaviour indicate that the simple correlations are in all likelihood overstating the potential impact of improved access to credit. Moreover, it should be noted that improved access to credit does not in and of itself lead to more firms having formal debt. Firm owners and managers must also decide to apply for formal loans. This is a selection, which is only dealt with indirectly in the statistical analysis. Still, even if the effect may be not be as large as implied by the correlation, it is still a statistically significant difference, and the analysis shows that firms that obtain loans, possibly for the first time, are clearly more likely to invest compared to firms that do not obtain loans. In that sense, restricted access to credit is a constraint on firm growth.

5.4. Closing Reflections

Comparing across 2017 and 2019, it is noteworthy that there has been a decline in the share of firms investing in the last two years when compared to the 2015-2017 phase. The majority of firms that made investments did so to increase capacity. A striking outcome is that there has been a sharp decline in the proportion of firms making investments in existing products, for

example to improve the production process or quality. In both phases, the most common source of funding is the firm's own capital, with the proportion of investments derived from this source increasing over the two years. Despite the smaller number of investments in 2019, the total amount invested in the manufacturing sector only declined slightly because the average amount invested increased.

There has been a decline in the already small proportion of firms applying for loans from 2017 to 2019. There is stability in those facing problems in obtaining finance, with around a quarter of firms referring to the issues they faced in both rounds of the survey. Many firms borrowing from formal sources continue to draw down very small funds, though the average formal loan amount has increased by more than 30 per cent.

Whilst there is still a very small number of firms borrowing from both informal and formal sources, there has also been a decline in the number of firms with current liabilities to informal financiers. Those that have borrowed from informal sources in the last two years have borrowed more than firms that drew down informal loans in the two years leading up to the 2017 survey. Interest rates from informal financiers continue to be substantially higher than the rates offered by formal lenders. With continued concerns surrounding access to credit, high interest rates from informal sources appear to be an ongoing but important side effect of this perceived issue.

Access to credit is a real constraint on firm growth in the sense that firms with formal debt have a higher propensity to invest compared to firms that do not have formal debt. However, the difference in investment behaviour is in all likelihood somewhat smaller than indicated by simple comparisons of proportions.

Finally, the stories for Tigers are nuanced and based on the various categories (size, registration and output) into which they are organised on issues pertaining to investment, introduction of new products and applications for loans.

6. Employment

Following the recent string of labour law reforms (ILO 2018), this chapter aims to provide an understanding of the employment structure in manufacturing in 2019 and its development since 2017. As described in Chapter 2, the survey includes an employment section within the owner/manager questionnaire, as well as a separate module interviewing a sample of employees from the businesses participating in the study.

The analysis in the present chapter relies on both the balanced firm panel and an employee data panel consisting of all employees interviewed at the visits to the firms that are included in the balanced firm panel. The samples of employees in the balanced panel of formal firms has 5,265 workers in 2017 and 4,194 workers in 2019.[5] The employee samples are weighted using the fair share rule, and assuming random selection of workers within each firm, such that the individual employee weights are computed as the number of employees in each firm divided by the number of interviewed employees, times the firm's sampling weight. Applying theses weights, the samples of employees in formal firms represent 776,236 and 777,353 employees in 2017 and 2019, respectively.

Section 6.1 will present the workforce composition and its changes over the two-year period. Section 6.2 will provide statistics on domestic migration. Section 6.3 will give descriptive statistics on qualifications held by employees, while section 6.4 will focus on wage levels and structures. Section 6.5 gives a few statistics on in-kind payments and other benefits while the final section 6.6 has a few concluding remarks.

6.1. Workforce composition

Table 6.1 compares the workforce composition between firms of different size and type. The number of workers belonging to each category is presented as a percentage share of the total employment.

Table 6.1: Workforce composition across firm type and size

	All Other Manuf.		Rice mills		Micro		Small		Medium+	
	2017	2019	2017	2019	2017	2019	2017	2019	2017	2019
Permanent	84.5	92.5	82.1	87.7	86.9	94.6	76.0	83.9	75.0	80.1
Temporary	15.5	7.5	17.9	12.3	13.1	5.4	24.0	16.1	25.0	19.9
Discrepancy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Full time	78.7	90.8	76.9	85.8	80.9	92.5	70.9	82.9	71.3	77.3
Part time	5.8	1.9	5.1	1.9	5.9	2.1	5.1	1.4	3.7	2.6
Temporary	15.5	7.5	17.9	12.3	13.1	5.4	24.0	16.1	25.0	19.9
Discrepancy	0.0	-0.2	0.1	0.0	0.1	0.0	0.0	-0.4	0.0	0.2
Female	30.1	30.7	9.8	8.7	18.7	20.3	38.8	33.3	47.4	49.2
Male	69.9	69.5	90.2	91.3	81.3	79.8	61.1	67.1	52.6	50.6
Discrepancy	0.0	-0.2	0.0	0.0	0.0	-0.1	0.1	-0.4	0.0	0.2

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Employees are either permanent or temporary, where the latter category refers to casual and seasonal workers. Permanent employees are then divided between those working full-time and those working part-time, meaning less than 44 hours per week. The "Discrepancy" row display

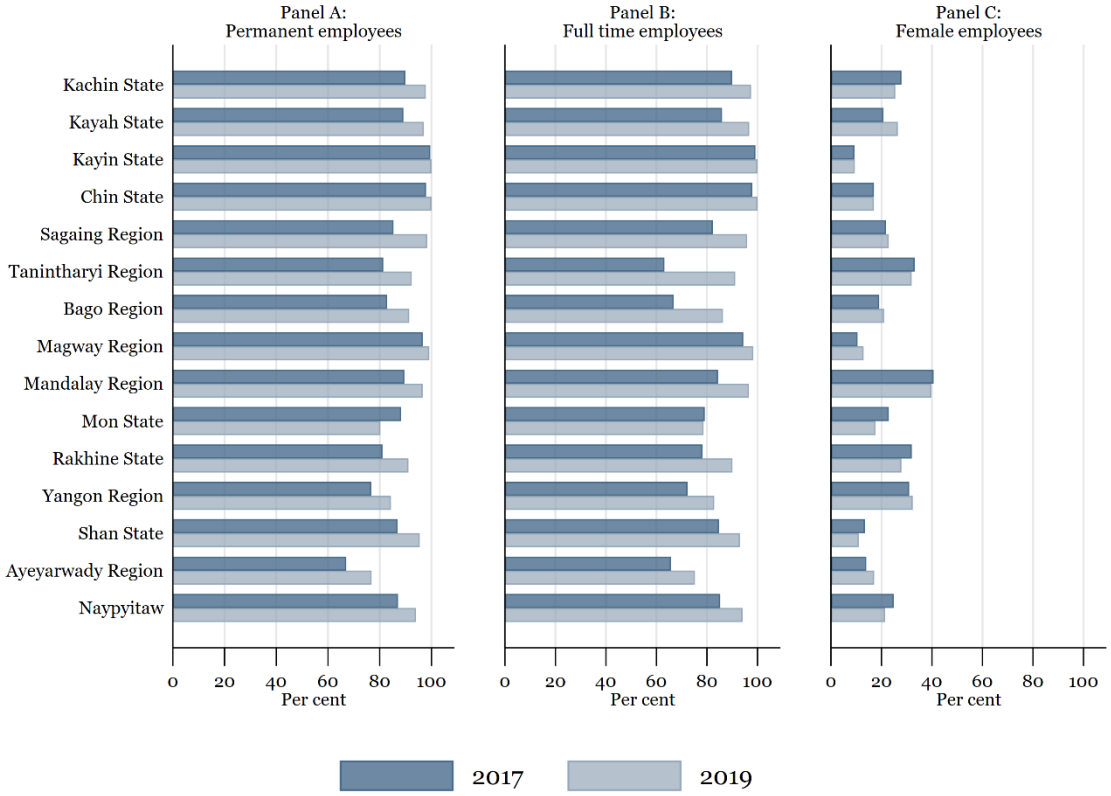
[5] Note that these numbers are lower than the ones reported in Table 2.8 because all interviews with firm owners are excluded from the employee data panel used in the present chapter.

the share of mismatch when totalling for each category. Noticeably, inconsistencies in the data are marginal across all firm groups.

The share of regular full-time workers has increased between 2017 and 2019. The highest shares are found in micro firms. Looking at firm type, "Rice mills" have a lower share of regular and full-time employees than other manufacturing businesses.

In 2019, female workers represent 31 per cent of workers in manufacturing firms, excluding "Rice mills". The share is virtually unchanged compared to 2017. The share of female workers increases steadily across firm size, from about 20 per cent in micro enterprises to almost 50 per cent in medium+-sized enterprises. "Rice mills" and small firms are the only categories where the share of women employed decreased from 2017 to 2019.

Figure 6.1: Shares of permanent, full-time and female workers across states/regions

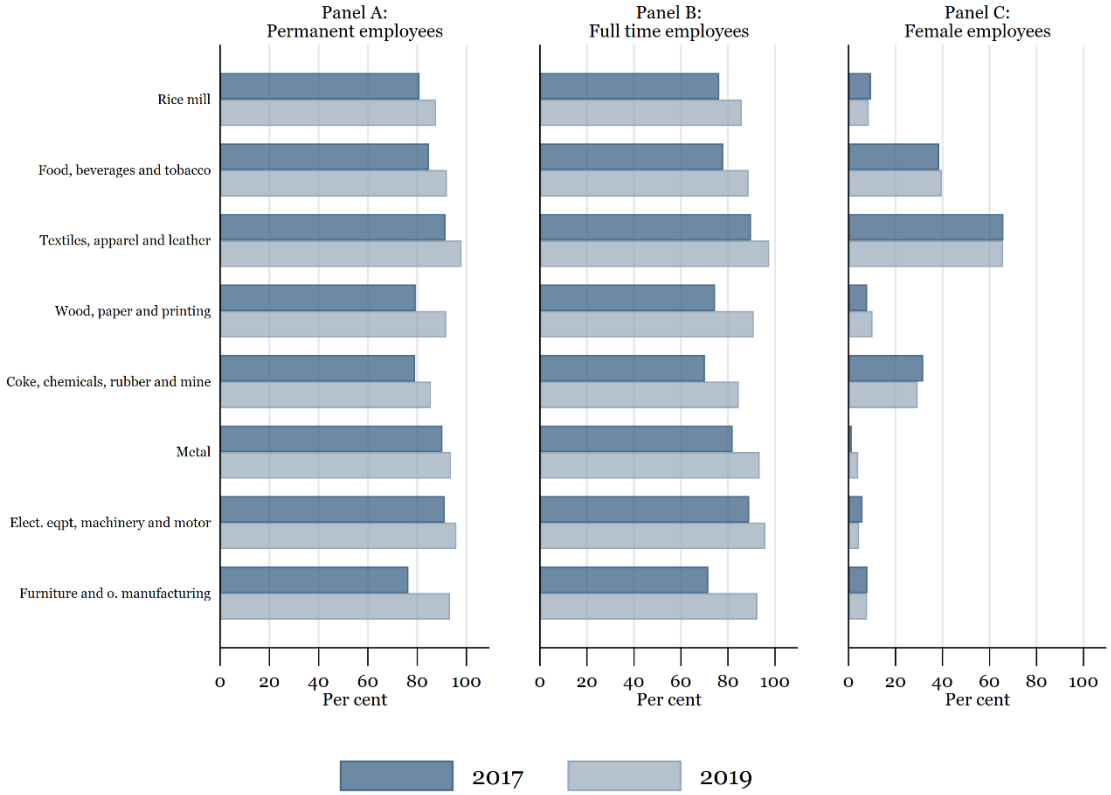


Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). The worker attributes are not known for all employees in all firms.

Figure 6.1 shows changes in shares of permanent, full-time and female workers across states/regions. The share of permanent and full-time workers has increased from 2017 to 2019 in all states and regions, with the exception of Mon State. Mandalay Region remains the area employing the highest share of women, while Kayin State, Magway Region and Shan State employ the lowest share. The share of female workers decreased in seven out of fifteen states/regions from 2017 to 2019.

Figure 6.2 displays a similar pattern across industrial sectors. The shares of both permanent and full-time workers have increased in all industrial sectors between 2017 and 2019. Female employees are mostly concentrated in the "Textiles, apparel and leather" sector. Women constitute 40 per cent of the labour force in the "Food, beverages and tobacco" industry and around 30 per cent in "Coke, chemicals, rubber and minerals". Female employment represents 10 per cent or less in all other industrial sectors.

Figure 6.2: Shares of permanent, full-time and female workers across sectors



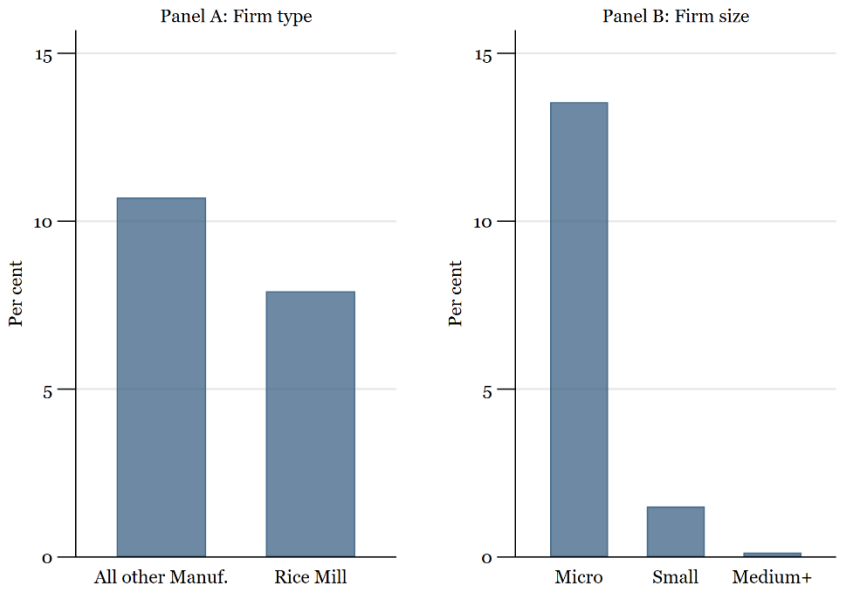
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). The worker attributes are not known for all employees in all firms.

As 30 per cent of the manufacturing sector is made up of family enterprises, mostly of micro size, unpaid family labour is expected to be important. Figure 6.3 displays the shares of unpaid family labour across firms of different type and size for 2019.[6] Unsurprisingly, unpaid family labour is mainly found in micro businesses, where it constitutes 13 per cent of the workforce.

Figure 6.4 shows that unpaid family labour is present in every industrial sector. When all firms are considered, the highest share is found in the "Electrical equipment, machinery and motor vehicles" industry. However, the picture changes when focusing only on micro firms. Then enterprises within the "Food, beverages and tobacco" industry is most reliant on this type of workers, followed by the "Textiles, apparel and leather" industrial sector.

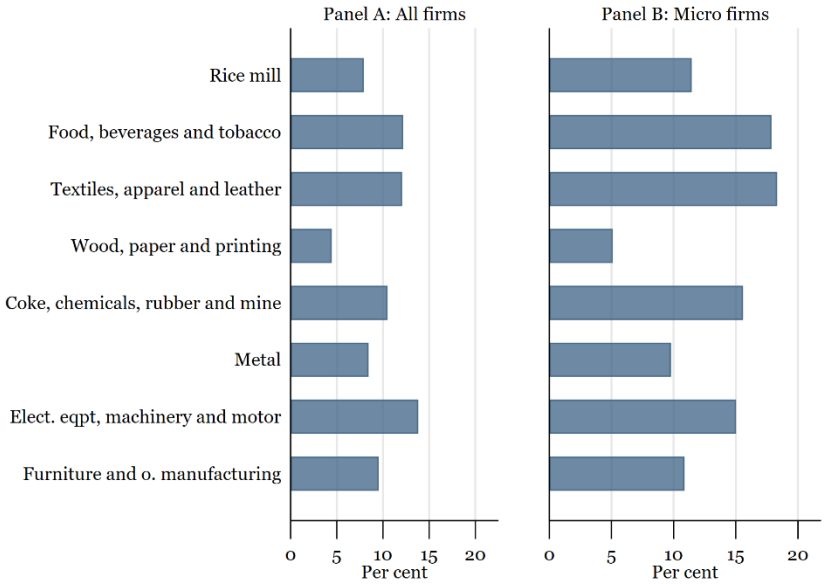
[6] The information about unpaid family workers was introduced in the 2019 survey round.

Figure 6.3: Share of unpaid family labour across firm type and size



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.4: Shares of unpaid labour across sectors



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Table 6.2 presents the share of occupations across different firm types and dimensions. Skilled production workers represent the core of the labour force. In 2019, the highest share of skilled

production workers is found amongst small and micro enterprises. In contrast, unskilled production workers and professionals are mostly employed by medium+ firms.[7] When interpreting the table, it should be noted that skill levels are self-reported.

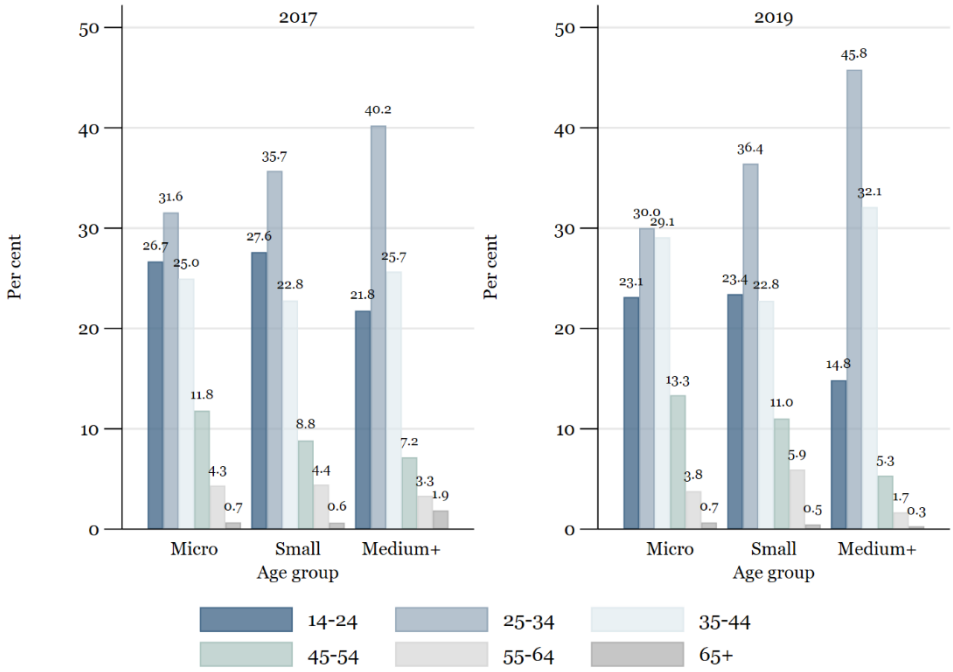
Table 6.2: Occupations across firm types and size categories

	All Other Manuf.		Rice mills		Micro		Small		Medium+	
	2017	2019	2017	2019	2017	2019	2017	2019	2017	2019
Manager	4.4	4.5	6.0	11.2	6.0	6.7	1.8	5.8	1.3	1.5
Professional	0.9	1.9	1.4	1.8	0.8	1.7	1.2	1.6	4.2	6.0
Skilled prod. worker	86.9	77.1	84.9	67.1	88.4	79.1	83.6	64.8	69.6	53.2
Unskilled prod. worker	6.7	4.8	7.2	6.5	5.1	4.2	10.7	6.8	14.7	11.8
Other	3.9	4.3	1.7	1.3	2.6	2.8	3.8	4.9	10.9	7.6
Discrepancy	-2.8	7.4	-1.2	12.1	-2.9	5.5	-1.1	16.1	-0.7	19.9

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

From Table 6.2 it is clear that the occupational composition has changed between 2017 and 2019. The share of skilled production workers declined across all enterprises, while the opposite is true for professionals. The number of unskilled production workers also decreased amongst most firm groups. Finally, Table 6.2 presents larger discrepancies than Table 6.1 particularly for "Rice mills" and larger firms, where occupation is unreported for many employees.

Figure 6.5: Age distribution across firm size categories



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Focusing on the matched employee-employer data, the following results are based on responses from the 10,427 interviewed employees. Several results are worth emphasising. First, Figure 6.5 displays the age distribution of workers across firm size categories. For both years

[7] Professionals are defined as employees holding a college or university degree.

and across all firms, the majority of workers are in the age group 25-34 years. The age group 35-44 is more common in medium+ firms, whereas older employees have the highest frequency within micro firms.

Second, instability of the labour force represents a considerable challenge to firm owners. Table 6.3 provides indicators for labour force stability across firms of different type and size in 2017 and 2019. For each category, the table presents gross and net turnover rates for permanent workers, as well as the average percentage share of permanent employees who have joined or left the firms between 2016-2017 and 2018-2019.

Table 6.3: Stability of the labour force across firm size and type (per cent)

	All Other Manuf.		Rice mills		Micro		Small		Medium+	
	2017	2019	2017	2019	2017	2019	2017	2019	2017	2019
Gross turnover	19.0	19.7	11.2	27.2	19.5	24.4	10.5	15.1	8.4	14.6
Net turnover	-1.6	-3.4	1.9	5.0	-0.9	-2.1	-0.1	1.0	0.6	1.1
Hired	8.7	8.1	6.5	16.1	9.3	11.2	5.2	8.0	4.5	7.9
Left	10.6	11.6	4.6	11.1	10.4	13.3	5.5	7.1	4.2	6.7
Voluntary	9.9	10.6	3.1	10.5	9.2	12.3	5.1	6.3	4.0	6.5
Fired	0.2	0.1	0.0	0.0	0.1	0.1	0.2	0.1	0.2	0.0
Other	0.5	0.8	1.6	0.6	1.1	0.8	0.2	0.7	0.1	0.2

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

There is a high employee turnover within the manufacturing sector. Gross turnover rates increased across all firms, reaching 24 per cent in micro firms. Net turnover rates in "All other manufacturing" also increased in absolute terms from -1.6 to -3.4 per cent, indicating that a higher percentage of permanent workers (full-time plus part-time workers) left firms in 2018-2019 compared with 2016-2017. This contrasts to the overall increase in full-time employment from 2017-2019 reported in Table 3.1, Chapter 3. Thus, firms seem to be substituting full-time workers for permanent part-time workers (as shown in Table 6.1). Finally, differences in net turnover rates are apparent across firm sizes. While the net turnover rates are negative in micro firms in both periods, larger firms report a positive net turnover rate, which also increased from 0.6 in 2017 to 1.1 in 2019.

6.2. Migration

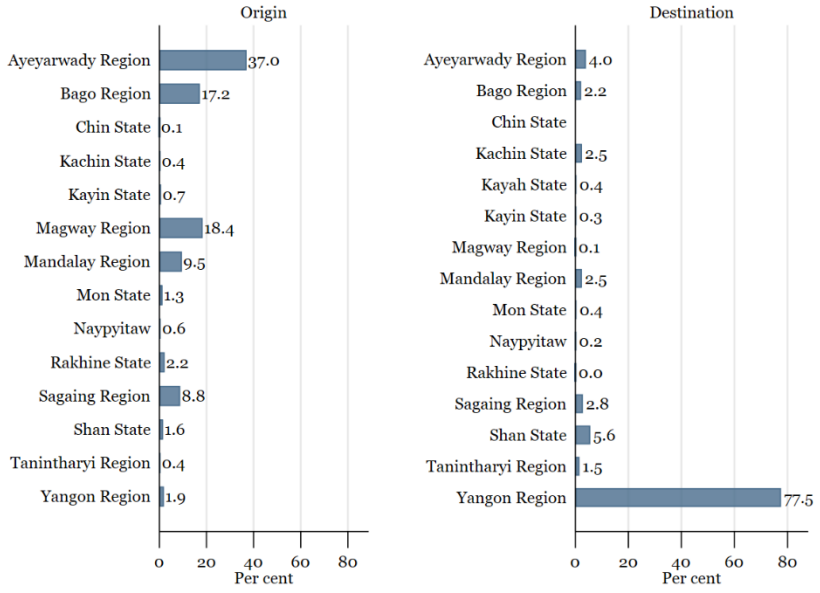
Citizens often migrate between states/regions in search for better employment opportunities. Based on the employees included in the 2019 sample, an estimated 11 per cent of the employees are domestic migrant workers.[8] From a gender perspective, the same percentage of men and women employed in the manufacturing sector are migrants.

Figure 6.6 shows the state/region of origin and destination for migrant workers employed in the manufacturing sector. Ayeyarwady Region is the predominant provider of migrant workers with 37 per cent of migrant workers originating from there. The main destination for migrant workers is Yangon Region.

Migrant workers are mostly employed in larger firms (52.8 per cent), as seen from Figure 6.7. However, migrants are also employed in small (29.3 per cent) and micro businesses (12.9 per cent). Finally, migrant workers are present across all industrial sectors (Figure 6.8) but appear to be more commonly found working in "Food, beverages and tobacco", "Textiles, apparel and leather" and "Furniture and other manufacturing" industries.

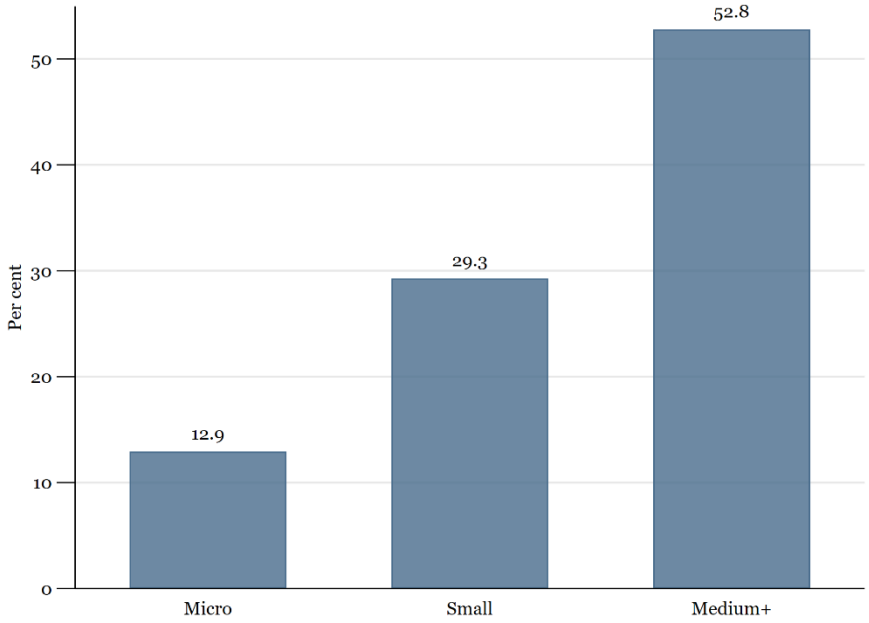
[8] Information on migrant workers was introduced in the 2019 survey round.

Figure 6.6: Origin and destination state/region for working migrants



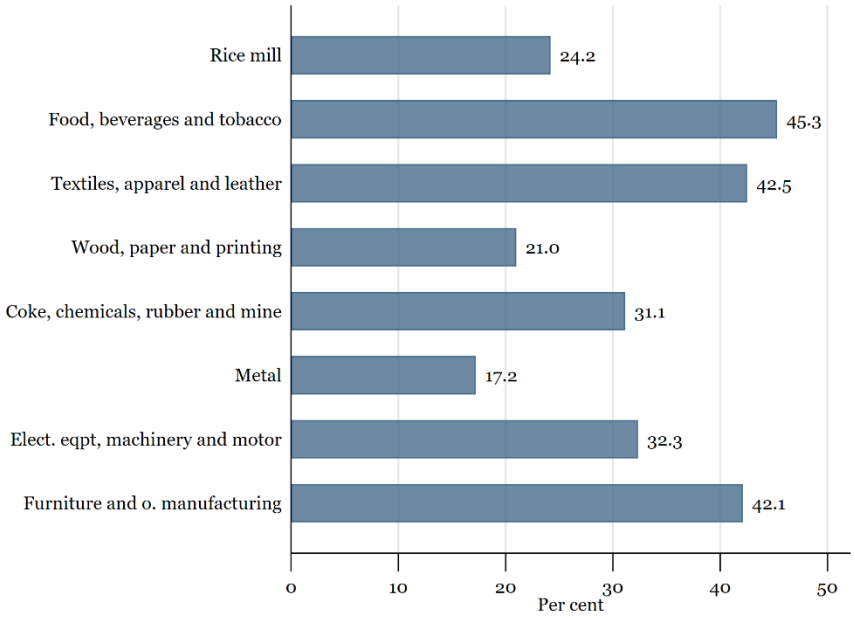
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.7: Percentage of migrant workers across firm size categories



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.8: Percentage of migrant workers across sectors



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

6.3. Workers' qualifications

As availability of skilled labour is an important condition for firm growth, the lack thereof has proven problematic for many firms. This section investigates the current situation seen both from the perspective of workers and owners.

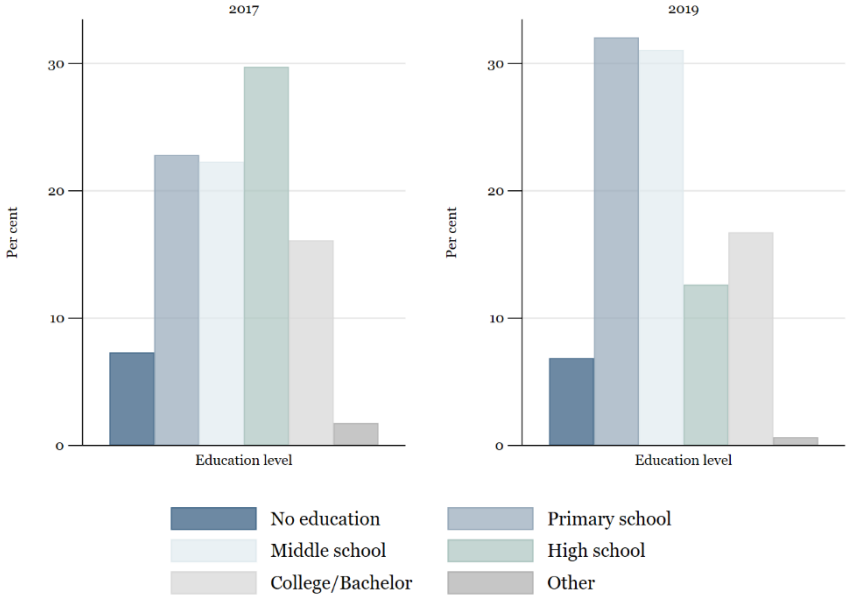
Figure 6.9 illustrates employees' education level - indicated by their highest completed schooling - across the employee sample. In 2017, almost 30 per cent of people held a high school degree, which dropped by more than half in 2019. The majority of workers in 2019 reported to hold only a primary or middle school degree. Thus, the share of workers with only primary or no education increased between 2017 and 2019, while the share of those with middle or high school education declined. The same trend is observable across firms of different sizes and is shown in Figure 6.10.

In spite of the lower average level of education, the number of employers reporting difficulties in finding skilled workers has declined from 2017 to 2019. The rest of the section will employ data from the employer side to provide a deeper understanding of the situation.[9]

Figure 6.11 shows the share of businesses within each size category reporting to have faced challenges in finding skilled workers. Across all size categories, the share of firms having trouble declined. While finding skilled workers was mostly problematic for small businesses in 2017 (over 30 per cent), medium+ firms are the group most commonly dealing with the issue in 2019 (over 20 per cent). The same trend is found across different industrial sectors, as shown in Figure 6.12. For both years, the industry sectors reporting the greatest challenge are "Textiles, apparel and leather" and "Electrical equipment, machinery and motor vehicles".

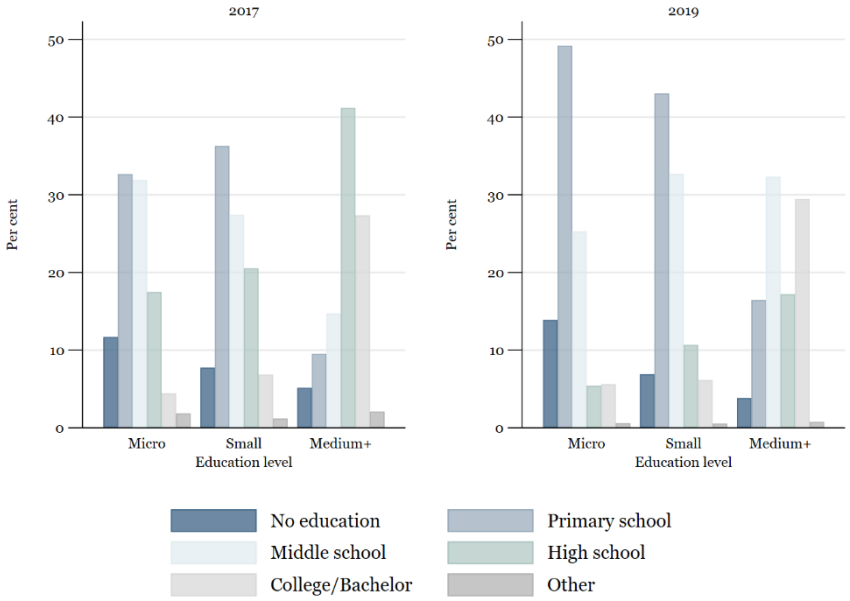
[9] The rest of section 6.3 is based on the balanced firm panel.

Figure 6.9: Education level across the workforce



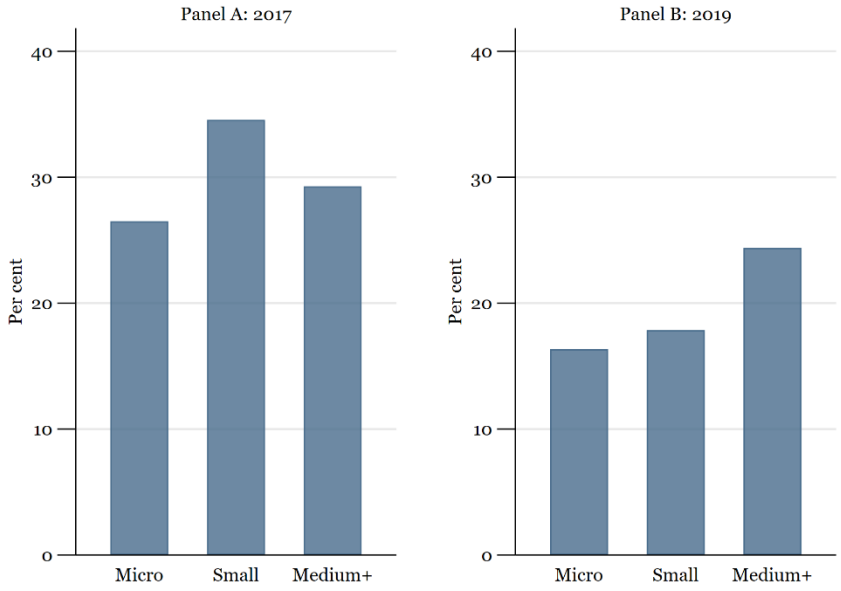
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.10: Education level across firm size categories



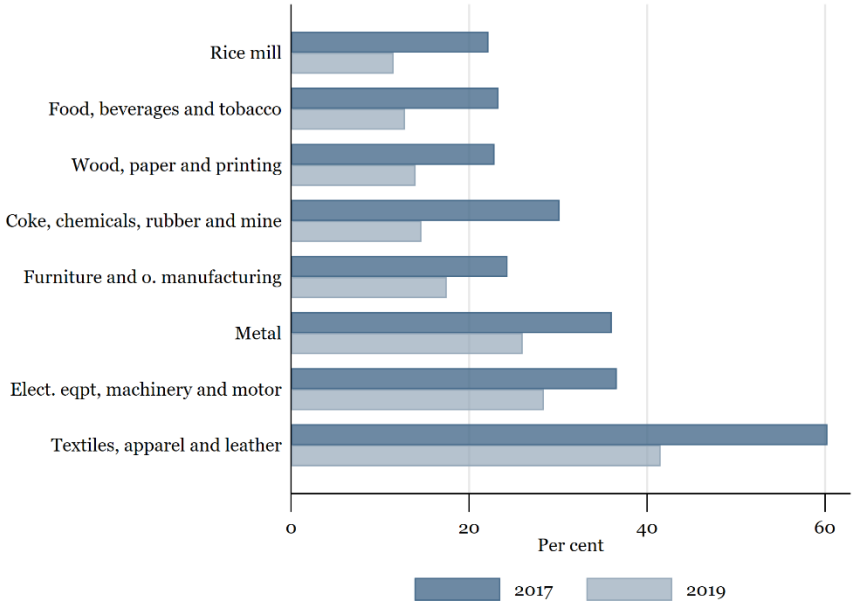
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.11: Challenges in finding skilled workers per firm size category



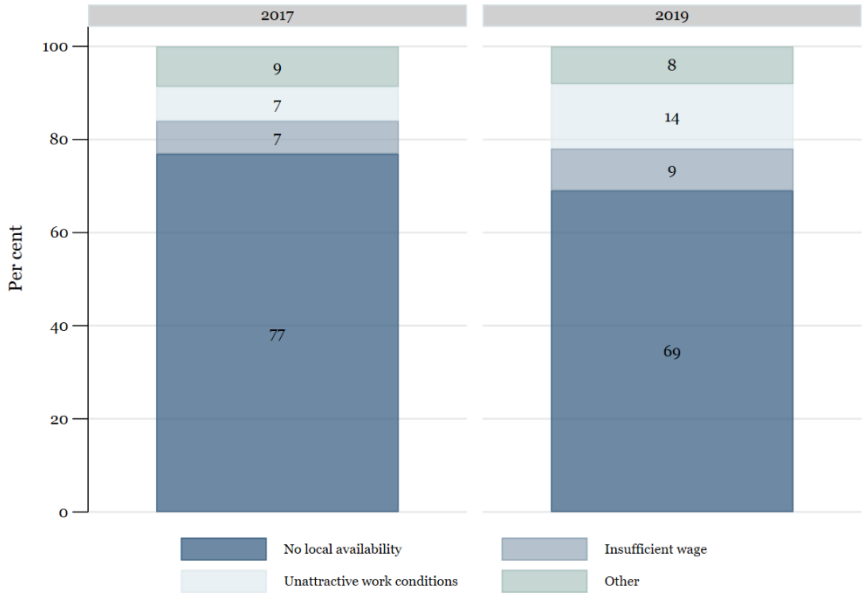
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.12: Challenges in finding skilled workers per sector



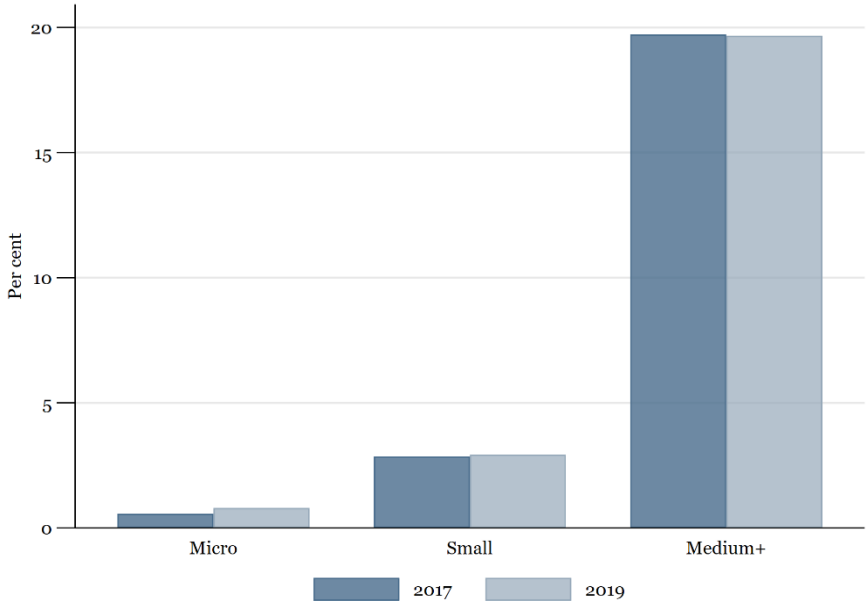
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.13: Reasons why employers find it difficult to attract skilled workers (per cent)



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.14: Percentage of firms that offered training



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Employers primarily find it difficult to attract qualified workers due to lack of locally available skilled labour, as shown in Figure 6.13. However, an inability to offer sufficient wages and unattractive working conditions are playing a bigger role in preventing businesses from attracting workers with adequate skill levels in 2019.

Finally, as mentioned in Chapter 3, firm owners train their workers in order to increase the skill level of their workforce. Figure 6.14 reports the share of firms offering training varies widely across size categories. For both years, around 20 per cent of medium+ businesses offered training, compared to approximately 2.5 per cent amongst small and around 1 per cent amongst micro firms.

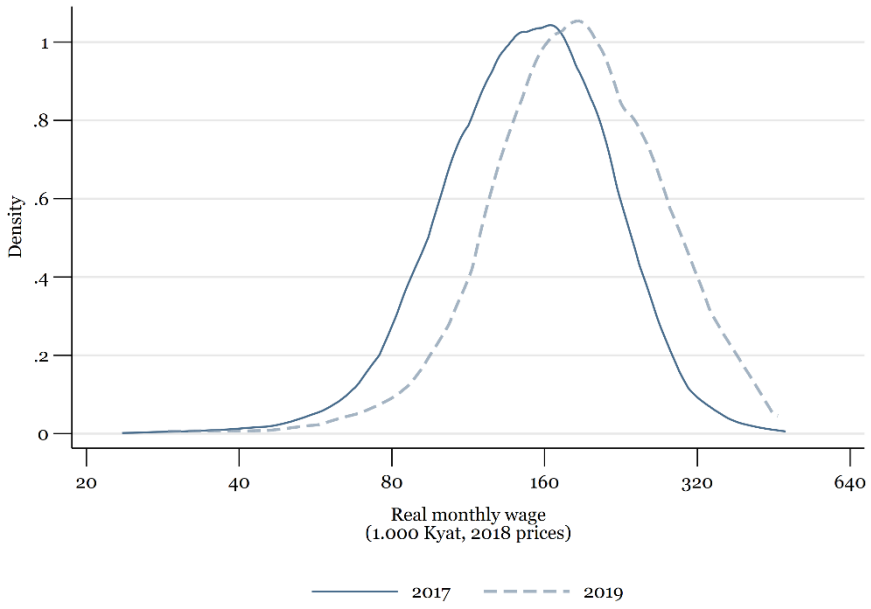
6.4. Wage setting

This section focuses on wage levels for employees, drawing on both firm and employee data. All wages are expressed in monthly terms and adjusted to 2018 price levels.

6.4.1. Wage distributions

Figure 6.15 and 6.16 show – through density lines shifted to the right – that real monthly salaries have increased from 2017 to 2019.[10] Figure 6.15 compares the distribution of real monthly wages, including the value of in-kind payments and allowances, as reported by permanent, full-time employees. The average of the real monthly salary reported by employees was 177,518 Kyats in 2019, as compared to 147,898 Kyats in 2017. Figure 6.15 shows a clear level shift in the wage distribution, indicating a general real wage increase for all workers in the balanced of firms.

Figure 6.15: Real monthly wage levels from employees' side

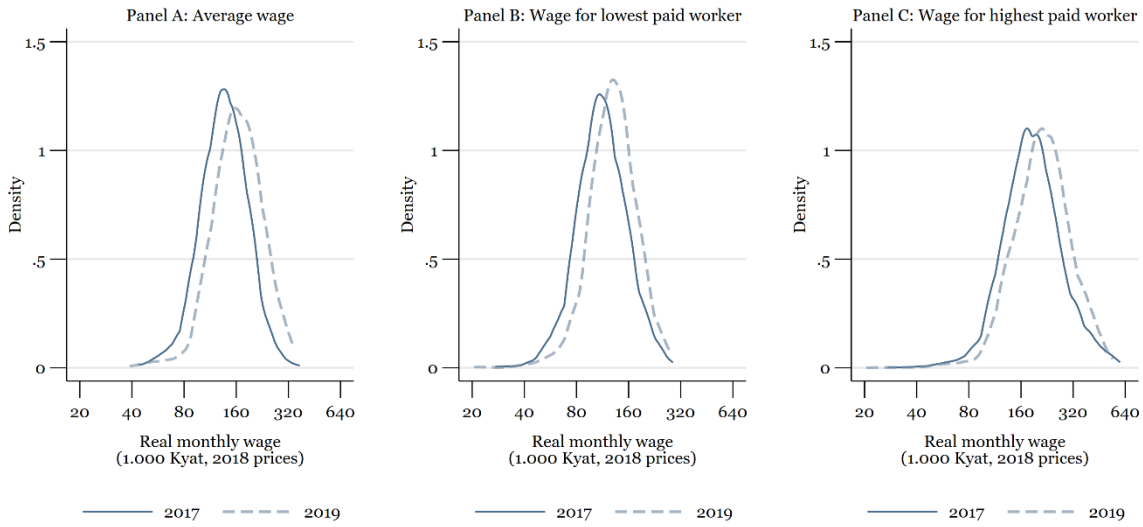


Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018). Wages reported include in-kind payments and allowances.

The indication of a general real wage increase is supported when looking at full-time production workers, for whom the average real monthly wages increased from 146,133 Kyats in 2017 to 166,030 Kyats in 2019 (see Figure 6.16, Panel A). Further support is seen from Panel B and C of Figure 6.16, from which it appears that the wage increases have benefitted both the lowest and highest paid production workers within each firm.

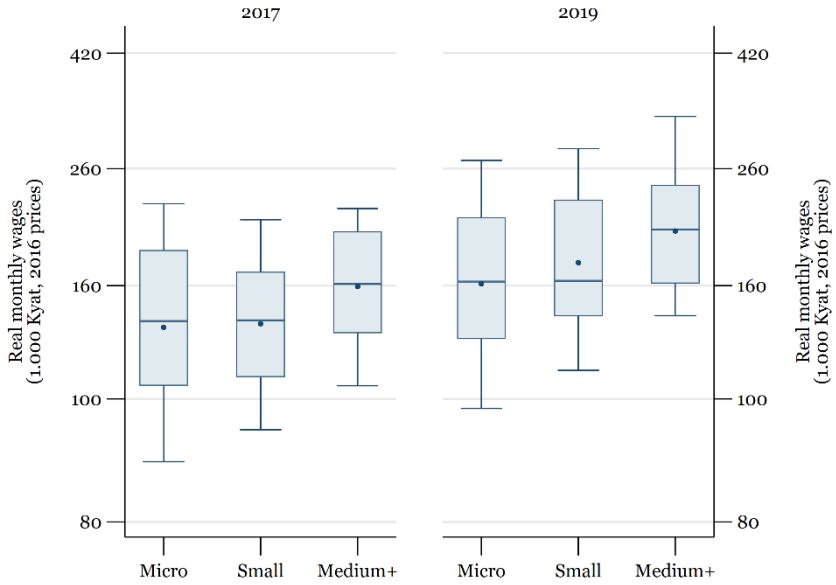
[10] All numbers reported here are calculated after a 98% Winsorization of the real wages.

Figure 6.16: Real monthly wage levels from employers' side (for permanent full-time production workers)



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.17: Real monthly wages across firm size categories



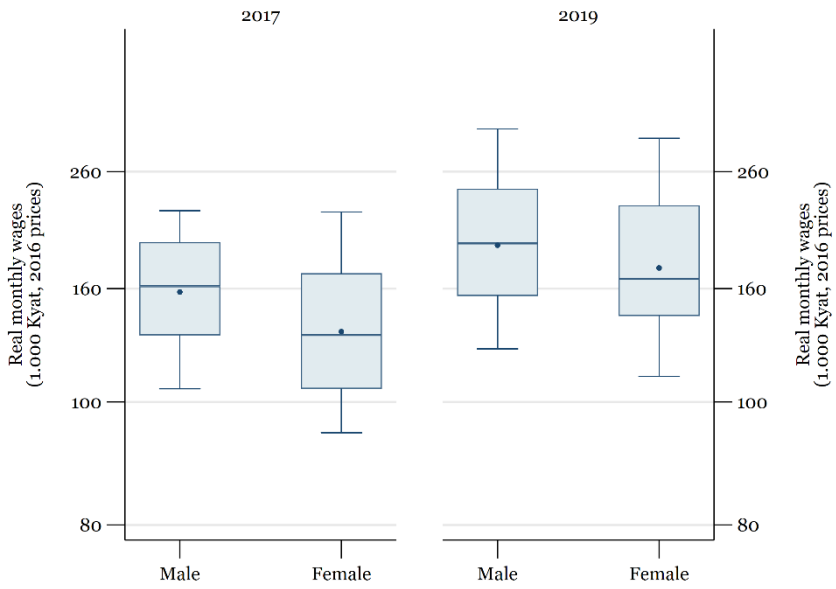
Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.17 and 6.18 display the distributions of real monthly wages across different size categories and gender, respectively. For both years, mean wages are highest in medium+ firms and lowest in micro firms.

Wages increased for both men and women between 2017 and 2019, as seen from Figure 6.18, but men continue to earn more than women do. Interestingly, wages in the lowest quartile

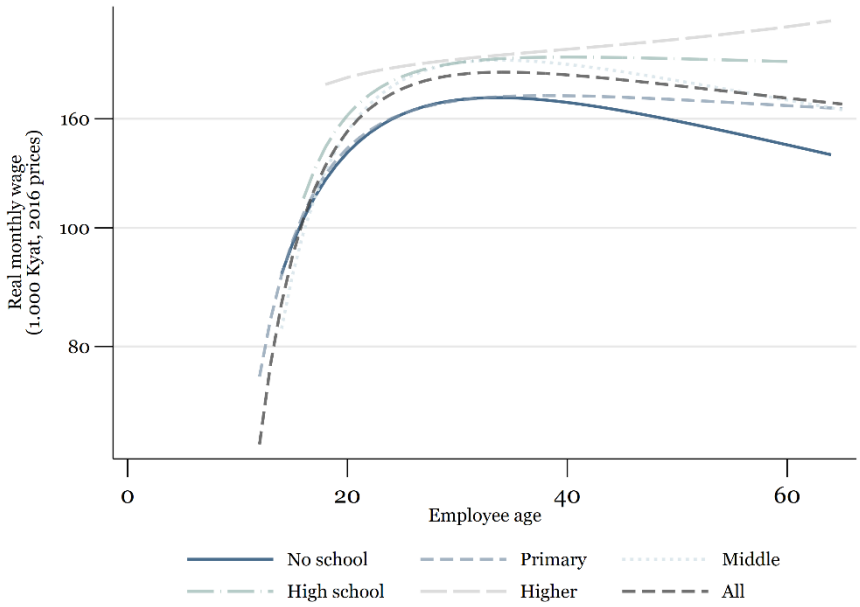
increased relatively more for women. However, the gender wage-gap have widened slightly for earners in the top-percentile.

Figure 6.18: Real monthly wages by gender



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 6.19: Real monthly wages by education level and age



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Finally, Figure 6.19 investigates the relationship between worker age and real monthly wages for workers with different levels of education in 2019. On average, wages increase for workers

until they reach the age of 30, after which they start to decline – except for workers with a higher education.[11] Wages for employees with a high-school education also seem to peak later (at around the age of 40).

6.4.2. Statistical analysis of wages and education

The influence of education and age on real wages is often analysed using Mincer regressions in which individual employees' real monthly wages, after a logarithmic transformation, are regressed on the employees' level of education and their work experience. Such regressions are given in Table 6.4 for both the 2017 and the 2019 survey rounds. The regressions are restricted to include only permanent, full-time employees and the wages have been Winsorized (98%, top and bottom) to limit the influence of extreme observations.

The education categories used in the regressions are the ones described in section 6.3 above. As work experience and the level of education are typically negatively correlated because it takes time to obtain a given level of education, a measure of 'potential experience' is constructed for each employee using his/her age and the typical age for completing a given level of education. Specifically, for employees with no education or at most primary school the potential experience is their age less 14, because 14 years is the minimum legal working age, and children normally finish primary school at the age of 11. For employees with middle school the potential experience is their age less 16, because the typical age for children completing middle school is 16 years. Following this line of thought, the potential experience for employees with high school degrees is their age less 19 and for employees with college education or bachelor degrees the potential experience is their age less 23 (high school plus 4 additional years of education).

Regression (1) in Table 6.4 gives the results for the 2017 survey round in which the dependent variable is the log of the real wage (2018 prices) and the explanatory variables are indicators of the employees' education level, their potential experience and its square (to fit the curvature observed in Figure 6.19), which is a very common wage structure. Moreover, a variable indicating if the employee is female is included, along with indicators for the location of the workplace in the form of state/region indicators.

The specification of the model is such that the constant term is an estimate of the logarithm of the average wage for male employees with no education and no working experience, located in Kachin State. There are 24 employees with such attributes in the sample. The estimate shows that in 2017 such an employee is expected to have a salary of about 105 thousand Kyats per month. This is higher than the lowest wages given in the figures above. This is due to the restriction of the sample to include only permanent, full-time workers. In turn, this restriction is imposed because part-time and temporary employees may well have unusual wage patterns compared to the permanent, full-time employees.

Given the logarithmic transformation of the real wage, the coefficients upon the education indicators can be interpreted as approximating the percentage changes in the wage level, compared to an employee with no education, comparable potential experience and same sex. Regression (1) shows that employees who have completed primary school are expected to have the same salary as an otherwise comparable employee with no education, as the estimated coefficient is very small, indicating a wage difference of 0.5 per cent, and clearly statistically insignificant at conventional levels of significance. Employees who have completed middle

[11] Employees holding a college, bachelor or master's degree.

school are likewise expected to receive about the same wage as comparable workers with no education as the point estimate, indicating about a 5 per cent higher wage, is statistically insignificant. Employees who have completed high school or higher do have higher wages, on average. For employees with high school education the difference is about 10 per cent relative to comparable lower educated employees while the difference is almost 30 per cent (100*[exp(0.249)-1] = 28.3) for employees with college or bachelor's degrees. In this sense, the 'return to education' appears to be low in the manufacturing sector in Myanmar compared to other countries, although the extra return to college and bachelor's degrees relative to high school education is in line with the international average.

Table 6.4: Mincer-type regressions for permanent full-time employees

	2017 (1)	2017 (2)	2019 (3)	2019 (4)
Primary school	0.005	0.002	0.008	-0.006
	(0.027)	(0.026)	(0.025)	(0.024)
Middle school	0.048	0.044	0.048	0.012
	(0.029)	(0.027)	(0.028)	(0.027)
High school	0.092***	0.066**	0.112***	0.065**
	(0.028)	(0.027)	(0.036)	(0.033)
College/Bachelor	0.249***	0.191***	0.149***	0.052
	(0.038)	(0.036)	(0.050)	(0.046)
Potential experience	0.024***	0.022***	0.025***	0.022***
	(0.002)	(0.002)	(0.002)	(0.002)
Potential experience, squared/100	-0.045***	-0.041***	-0.053***	-0.045***
	(0.004)	(0.004)	(0.006)	(0.005)
Female employee	-0.251***	-0.172***	-0.235***	-0.151***
	(0.017)	(0.018)	(0.020)	(0.020)
Number of full-time employees in firm (ln)		0.088***		0.122***
		(0.008)		(0.009)
Share of female employees in firm		-0.236***		-0.241***
		(0.033)		(0.037)
Constant	11.566***	11.498***	11.785***	11.652***
	(0.052)	(0.061)	(0.050)	(0.059)
State/region fixed effects	yes	yes	yes	yes
Sector fixed effects (8 sectors)	no	yes	no	yes
R-squared	0.215	0.292	0.136	0.230
Observations	4,774	4,774	4,103	4,103

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Unweighted estimates. Standard errors in parentheses are clustered at the firm level. The asterisks indicate statistical significance of the estimated parameters at different levels of significance: *** p<0.01, ** p<0.05.

The coefficient upon potential experience indicates a wage increase of about 2.4 per cent for the first year of work experience. The percentage increase is tapering off with the level of potential experience, which is the standard finding internationally, however, the curvature is not as pronounced as in other countries.

The final important observation in regression (1) is that female employees, on average, are expected to have wages that are about 22 per cent (100*[exp(-0.251)-1]=-22.2) below their male counterparts with comparable characteristics in terms of education and age. This is a very substantial wage gap considering that the employees are all in the private manufacturing sector. The result elaborates on the finding in Figure 6.18, as the regression result takes differences in educational levels and experience into account.

Regression (2) in Table 6.4 augments regression (1) by inclusion of the size of the firm in which the workers are employed (the number of full-time employees), the share of female employees in the firm and, finally, indicators for the sector in which the workers are employed (Sector fixed effects). The purpose of the inclusion of the additional control variables is to analyse the extent to which differences in wages across educational levels and across male and female

workers can be attributed to employees' own selection into specific production sectors or into micro, small or medium firms. Unsurprisingly, the return to education, estimated as the coefficients upon the education indicators, is smaller in regression (2) than in regression (1). This illustrates the effect of clustering of higher educated workers in certain sectors such as "Textiles, apparel and leather" and "Elect. eqpt, machinery and motor vehicles". Part of the wage premium to higher educated employees comes about because they are employed in high productivity sectors.

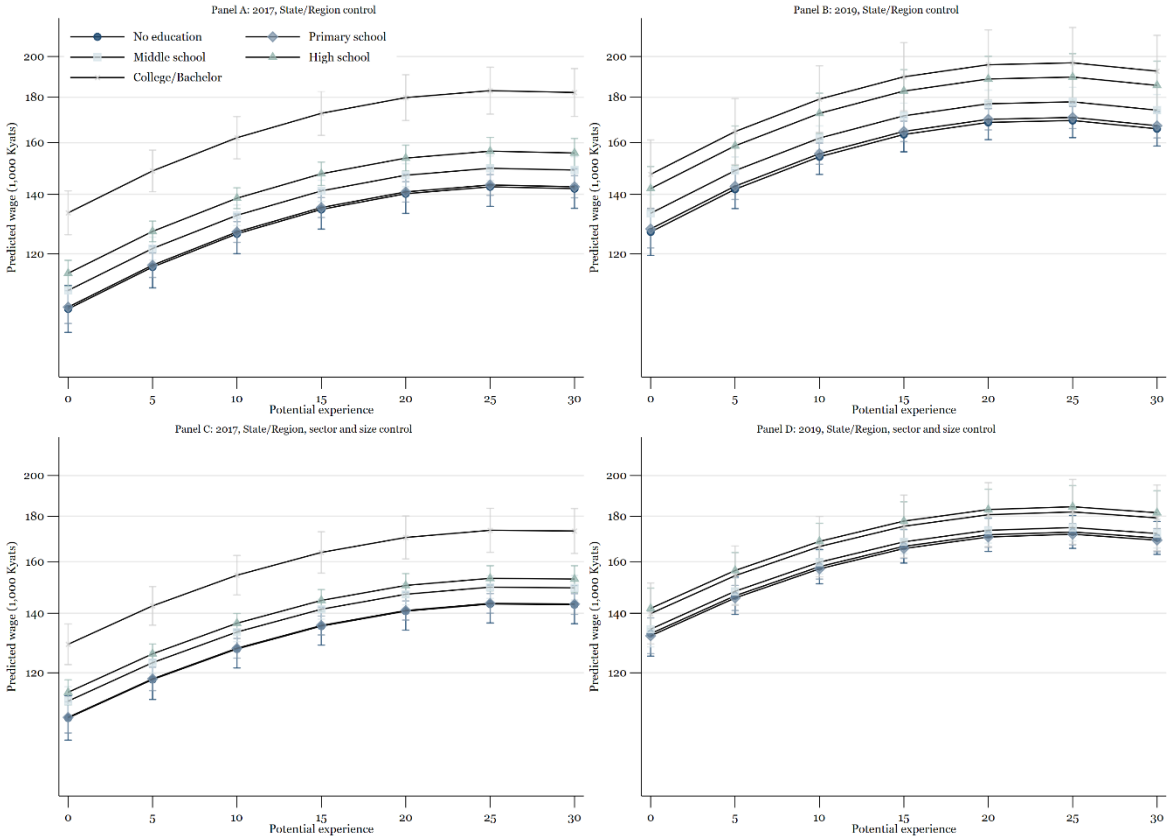
Another result in regression (2) is that firms with more employees, on average, pay higher wages than firms with fewer employees do, whereas working in a firm with a high share of female employees has a negative impact on the wage level both for the male and the female employees. These composition effects in terms of education level, average firm size and sex ratio are important to understand when comparing wage levels across regions and production sectors. Comparing, for example, the "Textiles, apparel and leather" sector with the "Elect. eqpt, machinery and motor vehicles" sector, there are the same fraction of highly educated employees (just over 50 per cent with high school or above), but as seen from Figure 6.2 there are more than 60 per cent female employees in the former compared to less than 10 per cent in the latter.

Regressions (3) and (4) have the same structure as regressions (1) and (2) but the former give results for the 2019 survey round for comparison. As seen, there are differences in the estimated parameters. However, most differences appear quite small, save the estimated return to college and bachelor's degrees, which drops dramatically, alongside the change in the constant term. The combined effect of the changes is illustrated in Figure 6.20. The Figure presents the predicted wage levels for employees with different characteristics in terms of education and potential experience. The effect on wage levels of the remaining characteristics are averaged out. Thus, male employees will be expected to have higher wage levels while female workers will be expected to have lower levels. The shapes and relative distances in the figures will be unchanged, though.

Figure 6.20 illustrates that wages are expected to increase for all levels of education and potential experience.[12] However, comparing panels A and B (and C versus D), the Figure also illustrates the decrease in the estimated returns to college and bachelor's education. It is noteworthy that in 2019 an employee with no education or only primary education and 10 years of potential experience (that is, a worker in the middle 20s) is predicted to earn as much as a college graduate with no experience. Moreover, if the uneducated worker is employed in a high wage sector while the college educated worker is employed in a low wage sector the prediction is that the wage of the uneducated worker even exceeds that of the college educated worker, as seen from the model predictions in panel D, in which sector differences are conditioned upon by averaging. In this sense, there is a very high return to experience compared to education.

[12] The restriction imposed by having common returns to potential experience for employees at all levels of education has been tested statistically and the restriction cannot be rejected at conventional levels of significance.

Figure 6.20: Predicted wages by education level and potential experience



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Unweighted estimates. Vertical lines indicate 95%-pointwise confidence intervals based on standard errors that are clustered at the firm level.

In order to give a metric to assess the size of the overall changes in wages from 2017 to 2019, Table 6.5 reports results of Oaxaca-Blinder decompositions of the Mincer regressions in Table 6.4. The average of the log-transformed wages is 11.810 in 2017 and 11.994 in 2019. These averages, when transformed back to real wage numbers, are 134,592 Kyats in 2017 and 161,781 Kyats in 2019. They are the geometric means of the wages for permanent full time employees. The difference in the log-transformed averages is 0.184 log-points, which is a difference of 20.2 per cent in the average wages. This increase in the average wage from 2017 to 2019, which is clearly seen in the figures above, is statistically significant. The question is how this increase has arisen?

The first row of Table 6.5 reports the decomposition of the wage increase from 2017 to 2019 (the 0.184 log-points). Columns (1)-(3) have the three-way Oaxaca-Blinder decomposition based on regressions (1) and (3) in Table 6.4 while columns (4)-(6) has the decomposition based in regressions (2) and (4). The decomposition is such that the wage increase is split into three components. The first component, the 'characteristics' effect, is computed as the change in the average of the characteristics from 2017 to 2019 times the estimated parameter in the 2019 regression. Say, for female employees, the share of female employees (the average) in the sample is 0.334 in 2019 and 0.341 in 2017. The difference, -0.007 is multiplied by the parameter from 2019, -0.235, resulting in an effect from the change in the share of female employees of 0.002. The second component, the effect from changes in 'returns' is computed as the change in the estimated parameters, multiplied by the average characteristic in 2019. Again,

for female employees the parameter change is (-0.235-(-0.251)) = 0.016. When multiplied by the share of female employees in 2019 the resulting returns effect is 0.016*0.334 = 0.0053, rounded to 0.005 in Table 6.5. Finally, the 'interaction' effect is the product of the two changes. For female workers this is -.008*0.016 = -0.0001, rounded to -0.000 in the table. Each of the three components can be added with corresponding components based on the other regressors. Adding the components for all regressors and parameter estimates results in the total decomposition of the difference, given in the first row in Table 6.5.

Table 6.5: Oaxaca-Blinder decomposition of the wage determination across years

	Regressions (1) and (3)			Regressions (2) and (4)		
	Characteristics (1)	Returns (2)	Interaction (3)	Characteristics (4)	Returns (5)	Interaction (6)
Decomposition of difference	0.011**	0.187***	-0.014***	0.016***	0.178***	-0.010
	(0.005)	(0.012)	(0.005)	(0.005)	(0.012)	(0.006)
Individual contributions						
Education	-0.013***	0.014	-0.002	-0.010***	0.013	0.001
	(0.003)	(0.008)	(0.005)	(0.003)	(0.008)	(0.005)
Experience	0.019***	-0.015	-0.003	0.018***	-0.018	-0.003
	(0.002)	(0.021)	(0.002)	(0.002)	(0.020)	(0.002)
Female employee	0.002	0.005	-0.000	0.001	0.007	-0.000
	(0.002)	(0.007)	(0.000)	(0.002)	(0.009)	(0.000)
State/Region	0.004	-0.083***	-0.009***	0.004	-0.065***	-0.011***
	(0.003)	(0.008)	(0.003)	(0.003)	(0.008)	(0.003)
#Full-time employees in firm (ln)				0.005**	0.067***	0.002**
				(0.002)	(0.022)	(0.001)
Share of female employees in firm				0.000	-0.002	0.000
				(0.002)	(0.015)	(0.000)
Sector				-0.002	-0.005	0.001
				(0.001)	(0.008)	(0.001)
Constant		0.265***			0.180***	
		(0.026)			(0.032)	
Observations	8,777	8,777	8,777	8,777	8,777	8,777

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Unweighted estimates. The average log-wage is 11.810 in 2017 (equal to 134,592 Kyats) and 11.994 in 2019 (equal to 16,178 Kyats). The differences is 0.184 log-points (se 0.012) which is a difference of 20.2 per cent in the average wages. Standard errors in parentheses are clustered at the firm level. The asterisks indicate statistical significance of the estimated parameters at different levels of significance: *** p<0.01, ** p<0.05.

It emerges from Table 6.5 that the increase in the average real wage must be attributed mainly to changes in returns while the effect of changes in characteristics is very small. The detailed decomposition reveals an interesting effect as two changes in the characteristics are countervailing each other. The first effect is from the decrease in the average level of education from 2017 to 2019, which is shown in Figure 6.9. Based on the regression models, the decrease in the level of education of the employees would have given rise to a decrease in the average real wage of about 1.3 per cent. This effect is countered by the fact that the employees in 2019 are older than in 2017. The effect of the change in experience is expected to result in an increase in the real wage of around 2 per cent. The countervailing effects nearly cancel each other out in the overall effect of changes in employee characteristics.

For the impact of changes in returns there are also counteracting factors, but these are of a different character. There is a negative contribution from relative changes in the wage levels across the states and regions. This effect comes about because the sample only has employees from Chin State in 2017. As the wage level in Chin State is much lower than the average across Myanmar, there is a very large change in the estimated parameter when employees from Chin State are included in the sample in 2017. As there are naturally also changes in the composition of the employees across locations when workers from Chin State are included, the interaction term is also significant.

Looking at the decomposition of the regressions that include additional controls, there is a slightly larger positive effect from the changes in characteristics. This increase comes about because the decrease in the average level of education from 2017 to 2019 is evaluated at lower rates of returns and thus a smaller number in the regressions with the additional controls while the positive effect of the increased potential experience is virtually unchanged. A second change is that larger firms appear to have increased wages more than smaller firms, giving rise to a positive returns effect from firm size. Yet, this only explains about 7 percentage points of the almost 20 per cent increase.

The dominating positive effect in both sets of regressions is from the large and highly significant increase in the constant term, which is the estimated base level for the wages. Thus, the regression decomposition supports and substantiates the information in Figures 6.15 and 6.20. That is, the increase in the average real wage of about 20 per cent from 2017 to 2019 is by and large a level shift, probably accompanied by a decrease in the returns to higher education leading to a slight compression of the overall wage distribution.

Exactly what has driven the large increase in wages across the manufacturing sector cannot be inferred from the statistical analysis. However, the very large growth in average labour productivity, measured by both revenue and value added growth per full-time employee, as documented in Chapter 3, lends support to an assertion that the employees simply get a share of the increased value creation.

6.5 In-kind payments and benefits

While real monthly wages have increased, Table 6.6 shows that the shares of employees receiving in-kind payments from their employers has generally decreased between 2017 and 2019. In 2019, a substantially smaller share of employees received in-kind payments in micro firms than in small and medium+ businesses. Likewise, a smaller share of employees in "Rice mills" report that their employer covers accommodation and transport cost when compared to other manufacturing firms.

Table 6.6: Shares of employees receiving in-kind payments across firm type and size

	All Other Manuf.		Rice mills		Micro		Small		Medium+	
	2017	2019	2017	2019	2017	2019	2017	2019	2017	2019
Food	0.46	0.39	0.49	0.38	0.40	0.28	0.37	0.40	0.55	0.43
Accommodation	0.41	0.35	0.32	0.23	0.32	0.25	0.36	0.36	0.44	0.33
Transport	0.27	0.22	0.09	0.02	0.15	0.07	0.14	0.12	0.35	0.27

Source: Authors' calculations based on MSME 2017 and 2019.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

According to the Social Security Law, employees are entitled to a series of benefits (including social and health insurance, sick leave and severance pay). The Department of Social Security Board is also implementing health and financial benefits and are undertaking work to understand the impact of medical services. However, as the majority of workers do not have any formal contract, oftentimes they receive few or no benefits. Looking at Table 6.7, this emerges very clearly as only a limited share of employees report to be receiving any benefits.

Table 6.7 investigates what benefits are provided to employees across enterprises of different types and sizes. Results are compared across years for all benefits except "Any payment when employee stops working" and "Unemployment insurance" which were added to the 2019 survey. Amongst firm groups, medium+ enterprises are the most likely to offer any type of benefits. Across all firms, sick leave and compensation for accidents are the most commonly paid

benefits, offered to 50 per cent of non-Rice mill employees. On average, the share of employees in larger firms receiving these benefits is as high as 80 and 60 per cent, respectively. Employees receive other benefits such as maternity leave and paid leave less frequently.

Table 6.7: Shares of employees receiving benefits across firm type and size

	All Other Manuf.		Rice mill		Micro		Small		Medium+	
	2017	2019	2017	2019	2017	2019	2017	2019	2017	2019
Sick leave	0.4	0.5	0.3	0.4	0.2	0.1	0.3	0.4	0.6	0.8
Maternity leave	0.3	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.4
Pension contribution	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compensation for accidents	0.3	0.5	0.2	0.4	0.1	0.2	0.3	0.4	0.3	0.6
Severance pay	0.3	0.0	0.3	0.0	0.1	0.0	0.2	0.0	0.4	0.1
Paid leave	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.3
Any pay when employee stops working	-	0.0	-	0.0	-	0.0	-	0.0	-	0.1
Unemployment insurance	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

6.6. Closing Reflections

When comparing employee characteristics and conditions between 2017 and 2019, it emerges that an increasing share of the employees are hired as permanent full-time workers. Interestingly, women continue to constitute a relatively small share of the total employment in the private manufacturing sector. Both female and migrant workers in the sector tend to be employed in larger firms. In contrast, unpaid family labour is concentrated in micro firms and in industries dominated by family businesses. Most employees are skilled production workers, although the share has declined between 2017 and 2019. Despite this, finding skilled workers is perceived as less of a challenge for business owners in 2019 than in 2017.

Employment in the manufacturing sector is characterised by high levels of both gross and net turnover, indicating that worker instability (seen from the employer perspective) and job security (seen from the point of view of workers) may be a concern. On the other hand, it may also indicate a flexible labour market with low search costs.

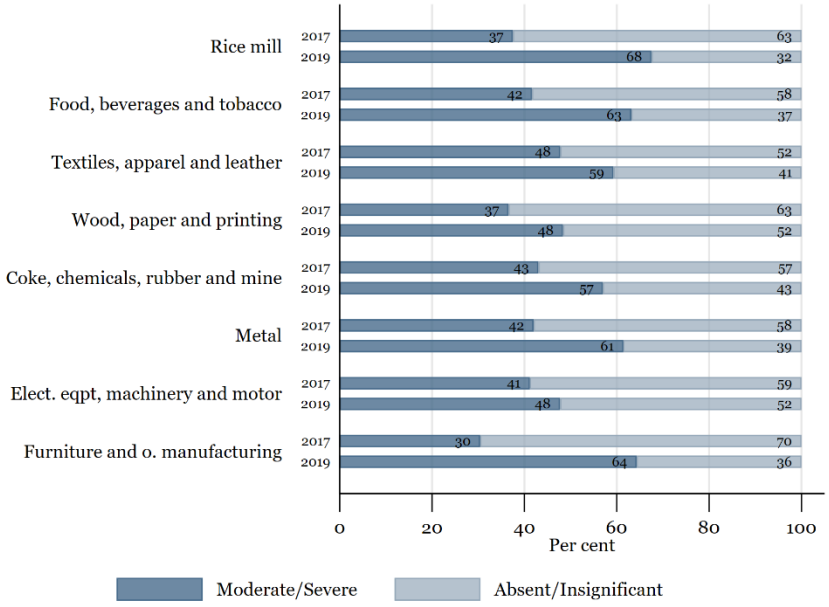
Wage levels increased substantially from 2017 to 2019, and salaries tend to increase with firm size. The returns to education in the form of average wage premiums for higher educated employees are low by international standards and they fell for the highest educated from 2017 to 2019. There is still a positive return for employees with high school education and above, though. A large part of the higher wage levels for educated workers can be attributed to the fact that such workers tend to be employed in high wage sectors. Moreover, male employees are paid higher substantially higher salaries than female employees even when educational and industry sector differences is taken into account.

7. Business constraints

The business environment comprises a combination of institutions, policies, human resources, infrastructure and geographic features that influence the effectiveness with which firms can operate. Enterprise investment, innovation and growth all depend on the quality of the business environment. This is because it affects the costs of production at the individual firm level, while it affects the market structure at the industry level. Understanding the conditions under which enterprises operate, as well as the constraints and opportunities they face is thus important for policies conducive to inclusive economic growth.

Against this background, this chapter presents the main constraints and potentials characterising the manufacturing sector in Myanmar as perceived by the owners/managers of the enterprises.[13] Owners' perceptions of the problems they face in their business and how these problems have changed over time is a subjective, but nevertheless very informed, indicator of the current business environment. As such, these perceptions may assist policy makers in supporting and regulating the business environment.

Figure 7.1: Owners' assessment of the competition in their field of activity, by year and sector



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

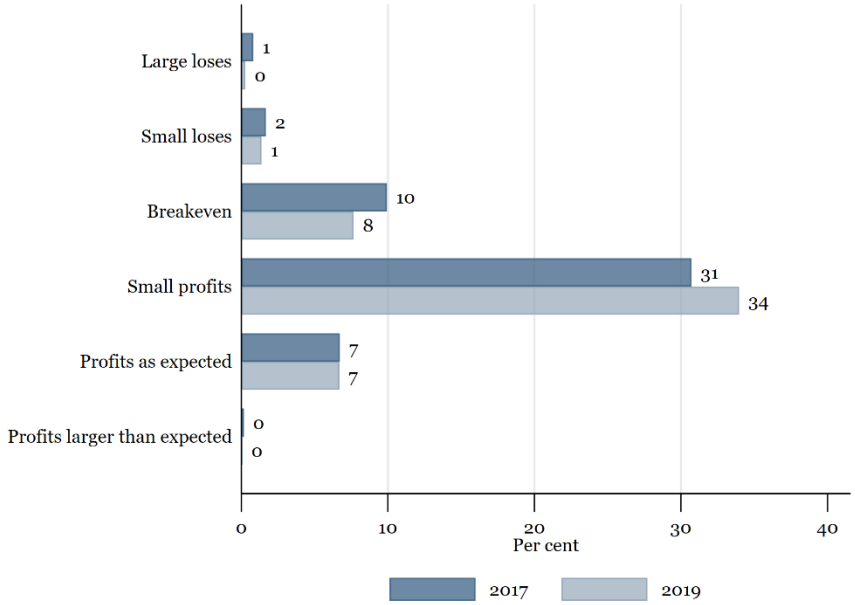
7.1. The competitive environment

Starting with the market structure, Figure 7.1 gives frequency distributions of perceptions of owners/managers of the competitive environment in which their enterprise is operating. Overall, the responses indicate an increase in the competitive environment from 2017 to 2019. In 2019, more than half of the owners/managers consider the competitiveness to be moderate or severe, a marked change from 2017, when the majority of the owners considered the competition "insignificant" or absent ("no competition"). The changes in the perceptions are common

[13] In the following, we refer to the owners and managers simply as the owners as 76 per cent of the respondents were the owners of the firms.

across industrial sectors, although the magnitude of the changes vary. “Rice mills” and “Furniture and other manufacturing” have seen a reversal in the perceptions from largely two out of three owners seeing “insignificant” or “no competition” in 2017 to two-of-three owners seeing moderate or severe competition in 2019.

Figure 7.2: Owners’ evaluation of the performance of their own enterprises



Source: Authors’ calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Despite the widespread perception of increased competition, there is no substantial change in the distribution of owners’ evaluation of the performance of their own enterprises. Figure 7.2 illustrates this result. Very few firms make losses, while about one-in-three report to make small profits. Interestingly, there are almost no surprises as very few owners/managers report large losses or larger than expected profits.

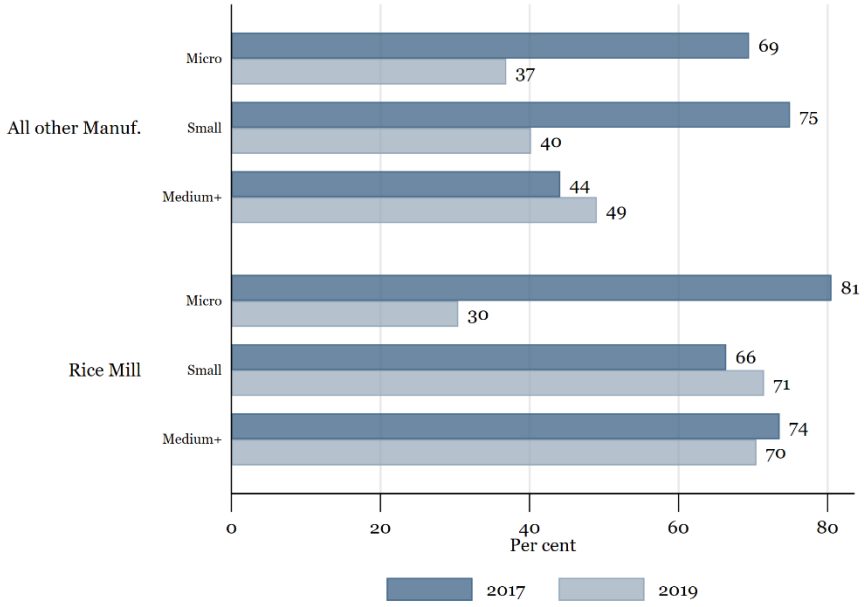
Underlying the unchanging frequency distributions in Figure 7.2 there is a stability in owners/managers’ responses for the two years. Half of the owners reported the same result in both years, while another 40 per cent changed response exactly one step in either direction. Thus, it appears that the owners have adapted their operations and performance expectations in accordance with the new market conditions.

7.2. The constraints to growth

Turning to enterprise growth, the proportion of formal enterprises in which owners reported that they faced important constraints to growth appeared very high in 2017, at 72 per cent. In 2019, the environment has changed dramatically as only 40 per cent of the owners now report to be facing important constraints to growth. A more detailed illustration of the change is given in Figure , in which the changes in the perceived business constraints are broken down by firm type and size. It is noteworthy that perceived business conditions have improved for the formal micro and small enterprises. Simultaneously, perceived constraints decreased from very high fractions in 2017, at 69 and 75 per cent, respectively, to only 37 and 40 per cent in 2019. Moreover, in 2019 there is no marked difference in perceptions across firm size in the “All other manufacturing” sector. While the positive development is also visible for micro “Rice mills”,

the small and medium size mills have a large majority of owners who consider the business environment to restrict their growth prospects in both years.

Figure 7.3: Proportion of firms reporting to be facing important constraints to firm growth, by firm type

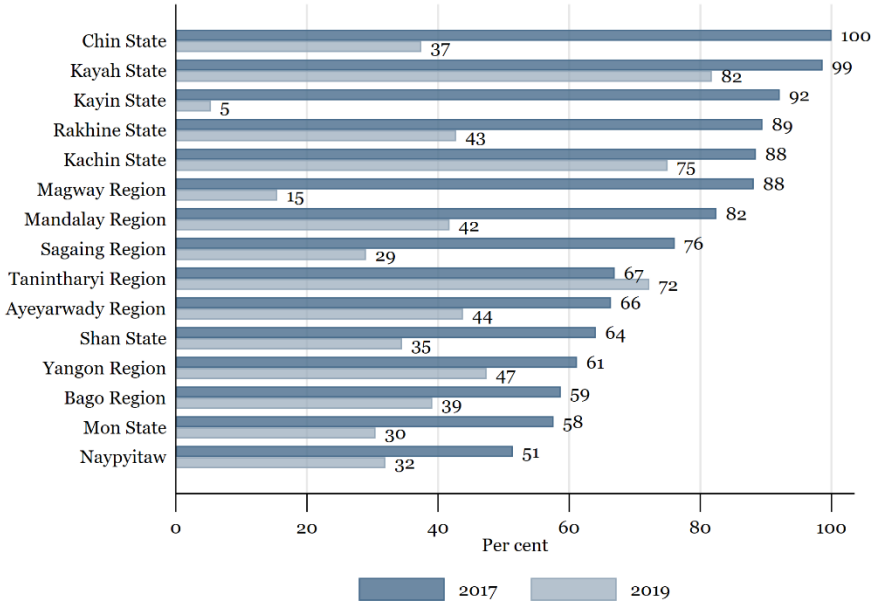


Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

The regional differences in perceptions are extensive, but the improvement in the business climate from 2017 to 2019 is widespread and there is a clear regional convergence in the perceptions. All owners in Chin State and almost all in Kayah State and Kayin State reported to have important constraints to firm growth in 2017. At the same time, the proportions of owners reporting such constraints were close to 50 per cent in Mon State, Bago Region and Nay Pyi Taw Union Territory. In 2019, it is only in Kayah State, Kachin State and Tanintharyi Region that more than half of the owners report to have important constraints to growth. In the other states/regions, less than half of the owners report to have "severe" constraints. In Kayin State the change is particularly noteworthy with a drop from 92 per cent in 2017 to 5 per cent in 2019, by which it moves from ranking third from the top in 2017 to the state with the lowest frequency in 2019.

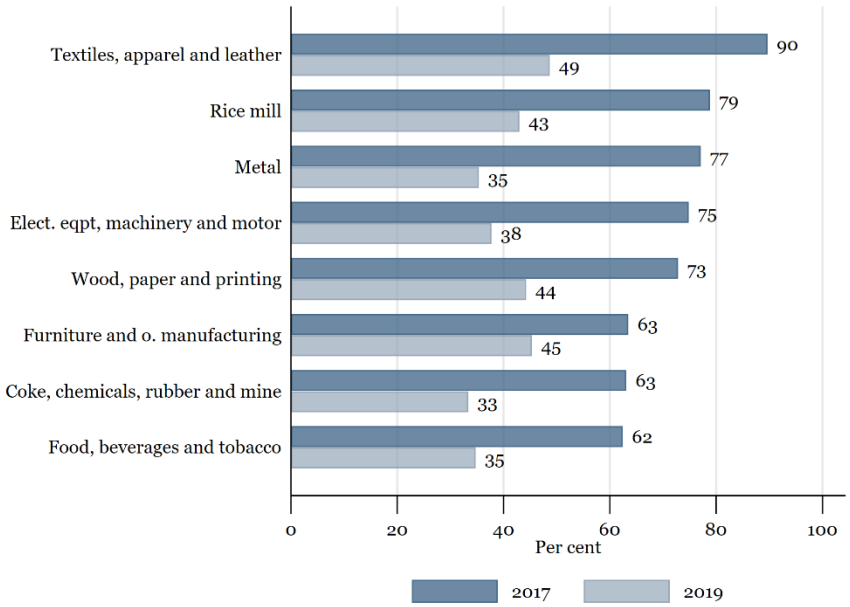
Figure 7.5 shows the decrease in the overall frequency is also accompanied by a convergence across industrial sectors. The range in the frequencies in 2017 was 62 to 90 per cent (a difference of 28 percentage points). In contrast, the range is only from 33 to 49 per cent (16 percentage points) in 2019.

Figure 7.4: Proportion of firms reporting to be facing important constraints to firm growth, by state



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Figure 7.5: Proportion of firms reporting to be facing important constraints to firm growth, by sector



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Considering the owners' perceptions of the competition within their area of activity jointly with their perceptions of restrictions to growth, a picture emerges of an improved and more

equal business environment for enterprises operating across states/regions and industrial sectors in 2019 compared to 2017.

Based in this convergence of the business environment, it is interesting to look into what owners perceive to be the most important constraints to growth in the two years. This information is given in Table listing the frequency distributions for the most important constraints in the two years and for different subsets of manager groups. Columns 1 and 2 are the frequency distributions in 2017 and 2019. The bottom row shows how the shares of owners reporting that they are not restricted increased from 28 to 61 per cent.

Among the firms facing restrictions, by far the most frequent reason given in 2017 was shortage of capital or credit. In fact, one-third of the owners reported this constraint in 2017. In 2019, when the majority of owners feel unconstrained the share of owners reporting to face a shortage of capital or credit is down to 12 per cent. Although this is a substantial decrease, the credit constraint is still the most frequently reported in 2019 and it constitutes about 25 per cent of the restricted enterprises.

Looking into the dynamics of the owners' perceptions, the third column in Table gives the frequency distribution for owners who reported to be restricted in 2017 but unrestricted in 2019, while the fourth column is the distribution for owners reporting to be unrestricted in 2017 but restricted in 2019. The last two columns are the distributions of reported constraints in each of the two years for owners reporting to be constrained in both years.

Table 7.1: Most important constraints to growth as perceived by the owners (per cent)

	2017	2019	2017 Only	2019 Only	2017 Both years	2019 Both years
Shortage of capital/credit	32.8	11.9	17.9	2.5	14.9	9.4
Cannot afford to hire skilled labour	2.3	2.3	1.3	0.5	1.1	1.8
Lack of technical know-how	7.6	4.1	5.7	1.4	1.9	2.7
Current products have limited/reduced demand	3.0	4.5	1.3	1.3	1.7	3.2
Lack of marketing services or transport facilities	3.3	6.6	2.1	1.9	1.2	4.8
Lack of raw material	5.5	4.0	2.6	1.1	2.9	2.9
Lack of energy (electricity/power, fuel)	5.0	0.8	3.9	0.2	1.0	0.6
Other factors	12.1	5.4	7.4	1.3	4.7	4.1
Not restricted in this sense	28.4	60.5	57.8	89.9	70.6	70.6

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Comparing the percentages in the bottom rows, it is seen that 42.2 per cent of the owners moved from reporting being restricted in 2017 to being unrestricted in 2019. This is quite different to the 10.1 per cent of the owners that felt unrestricted in 2017 but restricted in 2019. This leaves 29.4 per cent of the owners/managers who reported that they were restricted in both years. Starting with the latter group, the last two columns show that these owners were not all reporting the same constraints in 2017 and 2019. In particular, the frequency of reporting shortage of capital or credit dropped significantly for this group—albeit it is still the most frequent constraint. Two of the constraints that become more frequently reported are "Lack of marketing services or transport facilities" and "Current products have limited or reduced demand". As these constraints to growth are clearly related and linked to the demand side of the commodity market, firms appear to be facing weakening demand in 2018 instead of limited or overly expensive supply of raw materials, capital and labour. In this sense, the owners' perceptions are in accordance with both their perceptions of increased competition and with the macroeconomic conditions, as GDP growth in 2018 has been estimated to be at its lowest level in five years (World Bank 2019).

The perceptions regarding growth constraints are also in accordance with the owners' views concerning the assistance they would like from the authorities. Table lists the options for how the authorities could help the enterprises expand and increase their profits given in the questionnaire. The first two columns are the frequency distributions for the answers given by all formal enterprises in 2017 and 2019, while the subsequent columns give the response frequency distributions by firm size category.

Table 7.2: How could the authorities' best help the enterprise expand and increase its profits?

	All		Micro		Small		Medium+	
	2017	2019	2017	2019	2017	2019	2017	2019
By further removing bureaucratic requirements/restrictions	3.0	2.5	2.9	2.3	2.5	2.1	5.9	7.1
By assisting with better and easier access to premises/land	8.4	17.4	7.8	16.5	11.0	21.1	5.5	11.5
By creating infrastructure facilities	5.1	4.6	4.0	3.6	8.1	6.4	7.8	10.0
By providing easier access to credit	43.4	11.7	47.0	13.4	33.7	7.5	33.8	7.6
By restricting competition from imports	2.1	1.8	2.4	1.2	1.4	2.2	2.2	7.6
Through more liberal imports of inputs	1.9	2.1	2.2	2.1	0.6	2.1	3.2	2.9
By easing access to quality raw materials	8.9	7.0	7.8	6.0	12.7	9.9	7.3	7.6
Through assistance with technical know-how	9.3	9.7	8.0	9.6	11.9	9.1	16.3	13.5
By improving training facilities for workers	0.7	0.9	0.7	0.7	0.2	0.8	3.3	4.2
Through assistance with marketing	12.0	25.8	12.1	26.4	11.8	24.6	10.6	21.9
Through improving access to insurance mechanisms against natural disasters	0.6	0.2	0.7	0.2	0.1	-	1.0	1.2
By reducing risks from internal conflicts and civil unrest	0.4	0.2	0.2	0.3	0.9	0.1	0.7	-
Other	4.4	16.1	4.3	17.6	5.0	13.9	2.5	5.0
Total	100	100	100	100	100	100	100	100

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

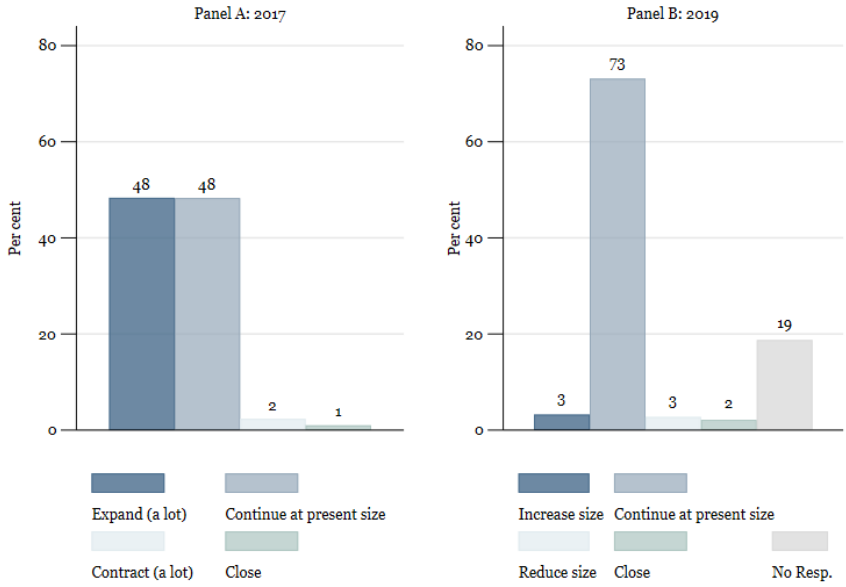
In 2017, the most frequent suggestion for assistance was provision of easier access to credit. This suggestion was most prevalent among owners of micro enterprises, where it constituted almost half of the suggestions given. For small and medium enterprises, it was also by far the most frequent suggestion, reflecting the answer given by about one-third of respondents.

In accordance with the change in the perceived growth constraints in 2019, the suggestions for assistance from authorities are aimed towards assistance with marketing and assistance with better and easier access to land. In 2019, 26 per cent of the owners suggested assistance with marketing as the best choice and this share is reasonably constant across firm sizes. Thus, the suggestions for government assistance show how the demand for this kind of support also exist in firms that do not report they are facing severe constraints to growth.

7.3. Owners' investment plans

The overall economic situation in Myanmar and the business environment have considerable influence on the owners' investment plans. This is illustrated in Figure in which owners' investment plans over the next two years at the time of the survey are given. The response options for the questions about the investment plans changed from the 2017 to the 2019 survey. Therefore, the frequency distributions of the responses are not directly comparable. Nevertheless, interesting insights are obtained from the comparison as the responses are from owners from the same firms.

Figure 7.6 Owners' investment plans over the next two years



Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

In 2017, almost half of the owners expected to expand the size of production while, for practical purposes, the other half expected to continue at the present size. This changed in 2019 when almost 3 out of 4 expected to continue at the present size while only 3 per cent expected to increase the size. Unfortunately, 20 per cent did not respond to the question in 2019. However, even if the 20 per cent non-respondents are expecting to increase the size, there is a marked decrease in the share of firms that expect to invest in order to expand the operations from 2017 to 2019.

When the results for the owners' investment plans are considered jointly with their views on severe restrictions on firm growth, it becomes apparent that the reason why lack of credit is no longer a widespread perceived constraint is that owners are no longer planning to invest. However, it should be noted that access to credit remains an important constraint for firms wanting to expand and invest. Hence, the reduction in the constraint is probably due to a decreasing demand for credit rather than an increase in supply of credit.

7.4. Tigers and informal firms

It is clearly of interest to know if the owners of the high productivity firms, the Tigers, have the same perceptions about obstacles, and the same changes in investment plans as the majority of the manufacturing sector. Likewise, it is also interesting to know if the owners of informal firms have very different perceptions than owners of formal firms. Data provided in Table -Table enable such comparisons.

Table 7.3 shows that owners of Tiger enterprises appear to have the same perceptions about the competition within the area of their activity as owners of other formal firms. If anything, the owners of Tiger firms may see their industries as more competitive in 2019 than the rest as more than 4 out of 5 owners of Tiger firms view competition as moderate to severe. This is contrasted by owners of informal firms for which a parallel movement towards perceptions of more competition is also observed, but to a much more limited extent. In fact, more than half

of the owners of the informal firms view the competition as "insignificant" or absent in 2019. A similar result is seen only in the "Wood, paper and printing" and "Electrical equipment, machinery and motor vehicles" industries for the formal enterprises. In this sense, the Tiger enterprises and the formal enterprises are the extremes in the manufacturing sector.

Table 7.3: The competition within their area of activity as perceived by the owners of Tigers and informal enterprises (per cent)

	Tigers		Informal	
	2017	2019	2017	2019
Severe	3.9	1.0	4.4	9.1
Moderate	25.1	80.3	23.9	38.4
Insignificant	64.6	14.1	43.1	27.3
No competition	6.5	4.6	28.6	25.3

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

The Tiger enterprises are also different from the other formal manufacturing firms when it comes to the perceptions about constraints to firm growth, as seen from Table . A larger fraction of the Tiger firms reported to be constrained in 2017 compared to other firms and markedly higher fractions reported that the main restriction was either lack of energy or lack of technical know-how. In this respect, it is noteworthy that none of the Tiger enterprise owners reported lack of energy as a restriction in 2019. The changes from 2017 to 2019 are also extreme as the fraction of owners of Tiger firms who reported to be restricted dropped from 82.6 per cent in 2017 to 21.4 per cent in 2019, an almost complete reversal of the fractions. The fraction of firms reporting that shortage of capital and credit was the most important constraint decreased, although it constitutes a large fraction of the firms that do report to be restricted in 2019.

Table 7.4: Most important constraints to growth as perceived by the owners of Tigers and informal enterprises (per cent)

	Tigers		Informal	
	2017	2019	2017	2019
Shortage of capital/credit	30.9	7.7	45.1	15.2
Cannot afford to hire skilled labour	0.5	1.1	2.4	4.0
Lack of technical know-how	10.4	0.2	5.1	5.4
Current products have limited/reduced demand	9.8	0.6	4.0	1.0
Lack of marketing services or transport facilities	0.0	8.8	1.7	4.7
Lack of raw material	1.2	1.4	1.0	0.3
Lack of energy (electricity/power, fuel)	22.3	0.0	1.0	0.3
Other factors	7.5	1.7	10.4	5.4
Not restricted	17.4	78.6	29.3	63.6

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

In 2017, owners of informal firms gave very similar responses as the owners of formal firms when questioned about constraints to growth. A larger fraction reported to have shortage of capital/credit. This is not surprising as the informal firms are not allowed to borrow from formal credit institutions as a company. The problem of weakening demand observed for the formal enterprises in 2019 is not observed to the same extent for the informal firms. Instead, there is a slightly higher fraction of unrestricted firms and more focus on supply side factors, such as problems with hiring skilled labour and lack of technical know-how. These differences are in good agreement with the reported differences in the views of the competitiveness in the areas of activity.

Table 7.5: Owners' investment plans over the next two years for Tigers and informal enterprises (per cent)

	Tigers		Informal	
	2017	2019	2017	2019
Expand (a lot)/Increase size	65.7	1.5	47.8	4.0
Continue at present size	32.7	69.6	48.5	73.1
Contract (a lot)/Reduce size	0.9	2.0	3.4	5.1
Close	0.7	0.5	0.3	1.7
No Response	-	26.4	-	16.2

Source: Authors' calculations based on Myanmar MSME 2017-2019 data.
Note: Weighted estimates. Weights in the balanced panel used in this report are generated from the population of manufacturing firms in 2019. These are different from the weights used in the CSO and UNU-WIDER (2018).

Finally, turning to the owners' investment plans, comparing the results in Table and Figure the differences between the Tiger firms and the informal firms on the one side and the other formal firms on the other is informative. More than two-thirds of the owners of Tiger firms were planning to increase the size of their enterprise in 2017, compared to about a half of formal firms. In 2019, however, Tiger firms are even less optimistic about the future, as only 1.5 per cent plan to expand, compared to 3 per cent for formal firms.

The result for owners of informal firms is in some sense even more noticeable, as their investment plans almost follow those of formal firms one-to-one in both years. This similarity in plans and optimism suggests that the formality-informality dichotomy is not strongly correlated with the degree of (perceived) business constraints in the manufacturing sector.

7.5. Closing reflections

This chapter illustrates that individual owners and managers of manufacturing enterprises are consistent in their views and perceptions about the situation of their business environment and their plans for the future.

In 2017, a certain optimism could be traced as a large fraction of owners felt they were operating in an environment with little competition. Consequently, a large share of owners were planning to expand the size of their enterprise and as they had difficulties in getting credit they felt (and reported), that inadequate access to credit was a major obstacle to firm growth. In accordance with these perceptions and plans, a large fraction of the owners wanted the government to assist in providing easier access to credit. In 2019, the picture is very different. Owners now perceive the competition to be moderate, a substantial fraction no longer plan to expand. Consequently, the demand for credit has decreased.

By comparing the owners' perceptions about constraints to their firms' growth, suggestions for government assistance and their investment plans over the two years (2017 and 2019) an interesting and somewhat disquieting conclusion arises. As noted, a key partial result is a substantial decrease in the share of owners who report that they have severe constraints on growth in 2019 compared to 2017. Further, the main restriction to growth in 2017, inadequate access to credit, while still present in 2019 is no longer overly severe. A natural response to such developments is to applaud the financial sector and the authorities for easing a severe constraint to growth. However, the owners' worries in 2019 have to do with weakening demand for their products, and surprisingly few owners are planning to expand the size of their enterprises in the coming years. Hence, the reduced importance of credit constraints appears to be related to a decrease in the credit demand, not an increase in the credit supply, as one can also see from Chapter 5. Thus, the weakened macroeconomic conditions have had an important impact on owners in the manufacturing sector, and they have adjusted their expectations for

the future in a way that may have serious consequences for the future growth prospects for both the manufacturing sector and by implication for the whole economy.

8. Conclusion

This report has sought to give a statistically representative description of enterprise dynamics in the formal manufacturing sector from 2017 to 2019. Based on detailed information from two rounds of interviews of 1,971 randomly selected, registered manufacturing enterprises, the report is able to go into details about important dimensions such as employment, investment, access to finance, the sectoral linkages and important aspects of productivity in the sector.

The statistical descriptions in the report are representative of about 62 thousand of the manufacturing sector's 70 thousand enterprises operating in 2019. The central theme in the report is the progress from 2017 to 2019 in the core business measurements. By focusing on the 1,971 enterprises, the changes recorded from 2017 to 2019 can be attributed directly to changes in the fixed group of firms that were interviewed first in 2017 and again in 2019.

The two survey rounds have information about the actions and expectations within enterprises from 2016/17 to 2018/19. This period is important and interesting because of the importance of the manufacturing sector for Myanmar's overall economic growth. Current predictions about the macroeconomic outlook are based on expectations of growth recovery in the manufacturing sector. This report has substantiated some of the necessary developments both in the manufacturing sector itself but certainly also in the financial sector for these expectations to come through.

The report has shown that manufacturing enterprises increased their capital intensity substantially from 2017 to 2019. However, this is a result of two changes. Some, mainly micro firms, have no change in their workforce of full-time employees, while others, mainly medium+ firms, have been able to increase capital intensity while simultaneously employing more full-time labour. Overall, the manufacturing sector has increased the full-time employment, a development mainly driven by a relatively small group of medium+ and large firms. The report has also shown how labour productivity and productivity growth varies across industries, state/regions and firm sizes.

A result closely related to productivity and employment growth is the promotion of industrial zones. To this end, it appears that productivity growth rates are not higher for (non-rice mill) manufacturing firms located inside the industrial zones. However, the small and medium+ firms located in the zones have had markedly higher increases in employment compared to same size firms outside the industrial zones, and this has not had negative effects on labour productivity growth for the medium sized enterprises.

Turning to forward and backwards linkages between enterprises, the report has drawn a picture of a manufacturing sector with a sparsely developed input-output structure. Most firms have local source and supply patterns. Only medium+ firms have the capabilities to extend their operations beyond country borders and less than 20 per cent of total output is supplied as intermediary products in value chains. A positive development is that the fraction has increased (slightly) from 2017 to 2019. Statistical analyses provided in the report also show signs of learning effects, flowing in both directions from customers to suppliers and from suppliers to customers. Thus, it should be a continued important policy objective to facilitate further deepening of value chains in Myanmar, enabling firms to specialise, cooperate and learn in order to increase their productivity.

Another possibly encouraging development is that the majority of firms do not face input constraints in 2019. This may, however, be related to the economic slowdown between 2016/17 and 2019 more than with improvements in supplies.

Comparing across 2017 and 2019 in other dimensions, it is noteworthy that there has been a decline in the share of firms investing. A striking outcome is that there has been a sharp decline in the proportion of firms making investments in existing products, for example to improve the production process or quality. Nevertheless, despite the smaller number of investments in 2019, the total amount invested in the manufacturing sector decreased only slightly because the average amount invested increased.

There has also been a decline in the already small proportion of firms applying for loans from 2017 to 2019 and, unfortunately, there is more stability in those facing problems in obtaining finance. Many firms borrowing from formal sources continue to draw down very small funds, though the average formal loan amount has increased by more than 50 per cent.

Whilst there is still a very small number of firms borrowing from both informal and formal sources, there has also been a decline in the number of firms claiming to face current liabilities to informal financiers. Those that have borrowed from informal sources in the last two years have borrowed more, on average, than firms that drew down informal loans in the two years leading up to the 2017 survey. Interest rates from informal financiers continue to be substantially higher than the rates offered by formal lenders and with continued concerns surrounding access to credit, high interest rates from informal sources appear to be an ongoing but important side effect of this perceived issue.

The labour market is characterised by a high level of turnover, indicating that worker instability and job security may be a concern. On the other hand, in may also indicate a flexible labour market with low search costs. Comparing labour force characteristics and conditions between 2017 and 2019, it emerges that an increasing share of employees are hired as permanent full-time workers. However, women continue to be a relatively small share of the total workforce. Both female and migrant workers in the manufacturing sector tend to be employed in larger firms. In contrast, unpaid family labour concentrates in micro firms and in aggregated industrial sectors dominated by family businesses.

Wage levels increased substantially from 2017 to 2019, and salaries tend to increase with firm size. The returns to education in the form of average wage premiums for higher educated employees are low compared to other countries in the region and they fell for the highest educated workers from 2017 to 2019. In 2019, there is still a positive return for employees with high school education and above, though. A large part of the higher wage levels for educated workers can be attributed to the fact that such workers tend to be employed in high wage sectors. Moreover, male employees are paid substantially higher salaries than female employees even when educational and industry sector differences is taken into account.

Exactly what has driven the large increase in wages across the manufacturing sector cannot be inferred from the statistical descriptions and analyses presented in the report. However, the large growth in average labour productivity, measured by both revenue and value added growth per full-time employee indicates that the employees wage increases are related to the increased value creation.

In 2017, a certain optimism in the manufacturing sector could be observed as a large fraction of firm owners and managers felt they were operating in an environment with little competition. Consequently, a large share of firms were planning to expand the size of the enterprise and as they had difficulties in getting credit many owners and managers felt, that lack of credit was a major obstacle to firm growth. In 2019, the picture is very different. Owners and managers now perceive the competition to be moderate rather than little or absent and a substantial fraction no longer plan to expand.

Comparing the perceptions of owners and managers about constraints to their firm's growth, suggestions for government assistance and their investment plans over the two years (2017 and 2019) an interesting and somewhat disquieting conclusion arises. A key result is a substantial decrease in the share of owners and managers who report that they have severe constraints on growth in 2019 compared to 2017. The main worries of owners and managers in 2019 have to do with weakening demand for their products, and surprisingly few are planning to expand the size of their enterprises in the coming years. Thus, the weakened macroeconomic conditions has had a major impact on owners and managers in the manufacturing sector, and they have adjusted their expectations for the future in a way that may have serious consequences for the future growth prospects for both the manufacturing sector and by implication for the whole economy.

The report has sought to highlight the development for a subset of firms in the surveys with exceptionally high labour productivity growth. The growth of labour productivity is central for the development and international competitiveness of the manufacturing sector. Therefore, it is of considerable interest to learn from the high growth firms. Thus, in the report several subsections and tables include statistical descriptions of a small set of 98 firms, denoted Tigers. The Tigers are the enterprises in the top five per cent of their size category (micro, small and medium+) when it comes to growth in labour productivity from 2017 to 2019. The stories for Tigers are nuanced and based on the various categories (size, registration and output) into which they are organised.

There are substantial differences in employment changes for Tiger firms. The productivity growth among some Tigers coincides with a shrinking workforce. Thus, the productivity increases in some Tiger enterprises have come through a deepened capital-intensity, where labour has been substituted for capital. However, on average, Tigers have hired additional workers between 2017 and 2019. This is particularly the case for medium-sized firms. The Tigers also had a higher average growth in the capital/labour ratio across almost all industries and firm sizes and the largest of the Tiger enterprises had on average ten times more capital per worker in 2019 compared to 2017. Thus, the larger Tigers have coupled their productivity increases with an incredible average increase in full time employment of 74.8 workers. The Tigers also experienced very high growth in revenue from 2017 to 2019, across all industries and firm sizes.

The important distinction between small and large Tigers also comes about in investment decisions. Generally, the Tigers invested less than the rest of the cohort in which they are placed. Specifically, amongst rice mills, Tigers were more than 80 per cent less likely to make an investment. Conversely, medium sized Tigers invested 2.5 times more than non-Tigers.

The report supports the conclusion that the manufacturing sector remains instrumental for Myanmar's economic growth. However, the changing picture in issues pertaining to productivity, sectoral linkages, investment and finance, employment, and business constraints leads to a need for considerations of renewed policies that support economic growth.

Some considerations include efforts to:

- Facilitate the further deepening of value chains, enabling firms to specialise and co-operate for increased productivity.
- Make efforts to improve connections to international value chains in food production.
- Invest in market-facilitation for sectors in which firms experience input constraints.
- Review the effectiveness of the industrial zones; specifically whether the acceptance of micro firms to such designated areas is in the best interests of the economy.
- Ensure that small, medium and large firms are able to access formal finance for investments that could lead to improvements in productivity.
- Incentivise training and upskilling opportunities for micro and small firms, particularly when productivity increases amongst these size categories can be achieved.
- Gain a deeper understanding of gross worker flows, the provision of contracts and the formation of wages.
- Ensure that a fair and inclusive labour market also embraces the gender dimensions in terms of employment opportunities and fair wages.

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