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SUPPLY SIDE EVIDENCE OF MYANMAR'S GROWING AGRICULTURAL MECHANIZATION MARKET

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INTRODUCTION

Recent evidence suggests that the mechanization of agriculture is proceeding rapidly in areas of Myanmar close to the country's major city, Yangon, as farmers - driven by the need to remain profitable in the face of labor shortages and rising wage rates - adopt a variety of labor saving technologies ([Win and Thinzar 2016](#)).

In this brief, we present findings from the first survey in Myanmar to analyze the supply side of agricultural mechanization.

We find evidence of rapid growth in the number, geographical distribution, and sales of agricultural machinery supply businesses. The range and value of machinery sold accelerated rapidly, especially post-2011 as the country opened economically. New hire-purchase financing arrangements for machinery played a key role in facilitating this growth.

METHODOLOGY

This research highlight presents data from a survey of machinery supply businesses, located in a commercial area on the western edge of Yangon (Mingalar Thanmyint compound). The survey was conducted in July 2016.

Scoping interviews conducted pre-survey indicated that most of the agricultural machinery supply businesses in Yangon, including many of the largest in the country, have branches in the compound, making it the largest cluster of such enterprises in Myanmar by far. A survey instrument was developed based on scoping interviews prior to survey rollout, and pre-tested with businesses outside the cluster.

A census of businesses in the cluster was conducted, and 30 dealerships selling agricultural machinery and 27 shops selling spare parts for agricultural machines were listed. All agricultural machinery suppliers and spare parts shops in the cluster were selected for survey. Three machinery

suppliers and five spare parts shops declined to participate, giving a total sample size of 49 businesses.

This research highlight presents findings on the 27 agricultural machine supply businesses that responded to the survey.

RESULTS

Business Structure and Activities

The market for agricultural machinery is highly concentrated. The three largest dealerships surveyed accounted for 58% of the estimated value of sales made during the first six months in 2016. The eight largest dealerships shared 91% of the total value of sales. Similarly, whereas 70% of machine supply businesses (19 enterprises) had three or fewer branches, the largest operated 23 branches nationwide.

The range of products stocked is closely related to business size. Small dealerships (defined here as having three or fewer branches) specialize mainly in sales of small, relatively low cost equipment, such as engines, water-pumps, and two-wheel tractors. Large dealers generally stock wider product assortments that include large high value machines such as combine harvesters, four-wheel tractors and trawlajee¹, as well as a variety of smaller machines.

Fifty-six percent of machinery suppliers market their products with assistance from networks of rural sales agents known as *distributors*. Distributors stock small numbers of machines consigned by dealerships, on which they can earn sales commissions, or seek out and refer potential customers to dealerships, vouching for their reputation and creditworthiness. Each dealership that

¹ Multi-purpose farm vehicles commonly used for transport in rural areas.

works in this way has an average of 37 affiliated distributors.

Most dealerships specialize exclusively in sales of machinery, but there is some diversification of activities and services. Five businesses (four large, one small) reported manufacturing items in their own workshops in Myanmar, or subcontracting out the manufacture to companies in China. Domestic manufacture started as early as 1990, while subcontracting to China began after 2005.

Domestic manufacture is presently limited to production of simple welded parts; trawlajee frames (produced by three enterprises) and metal wheels for two-wheel tractors (produced by two). Items subcontracted out for manufacture included wheels for two-wheel tractors (two dealers), and trawlajee frames, two-wheel tractors, plough sets, other machine attachments, dynamos, and engines (one dealership each).

One third of dealerships (six large and three small) assemble machinery. This reduces import costs as parts take up less space during transport than fully assembled machines. Assembly of two-wheel tractors (seven companies) and trawlajee (six) was initiated in 1995. Companies producing trawlajee frames and wheels for two-wheel tractors combine these with more complex imported parts. Four dealerships also began to assemble of four-wheel tractors and combines recently.

Most machinery dealers (74%) also sell spare-parts. Only three agricultural machinery dealers (11%) provided repair services.

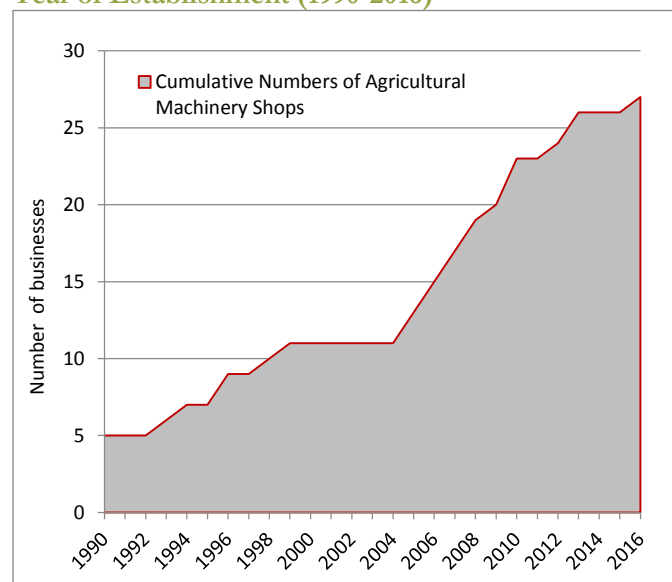
Two businesses in the cluster offer machine rental services; one renting out combine harvester services and one renting both four-wheel tractors and combine harvesters. This reflects the fact that the machine rental services market is dominated by rural entrepreneurs.

Growing Businesses

The cumulative number of machinery dealerships established within the cluster between 1990 and 2016 is illustrated in Figure 1. Five businesses were already established in 1990. Numbers grew gradually until 2004, then more than doubled (from 11 to 23) in the six years to 2010 and increased more slowly thereafter, to reach 27 in 2016.

New branches outside the cluster were established at a much faster rate than new businesses inside it, particularly after 2010.

Figure 1. Cumulative Number of Machinery Supply Businesses in Mingalar Thanmyint Compound, by Year of Establishment (1990-2016)



Source for all figures: Authors, MAAS 2016.

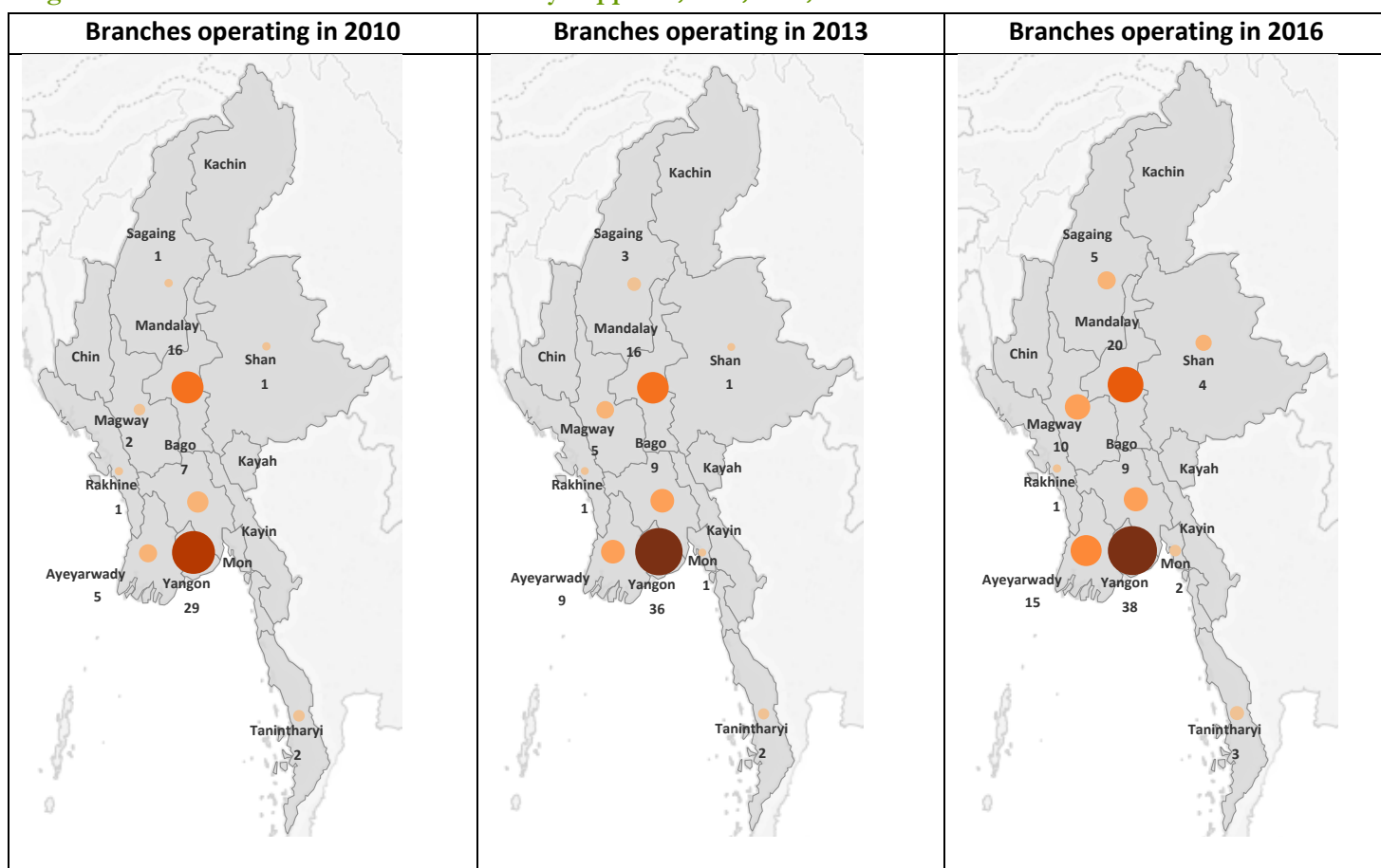
Figure 2 illustrates the geographical distribution of branches belonging to businesses in the cluster in 2010, 2013, and 2016.

In 2010, outlets were highly concentrated in Yangon, Mandalay, Bago, and Ayeyarwady. These regions form a core agricultural corridor running down the center of the country along course of the Ayeyarwady River, and include Myanmar's two largest cities. There were 64 branches in operation, of which 89% were located in these four core regions.

From 2011-2013 the number of branches operated by businesses in the cluster grew by 27% to reach 81. Most of this growth occurred close to Yangon. From 2014-2016, branch numbers increased by a further 29% to 104. Growth in the delta continued during this period, but was accompanied by the establishment of increasing numbers of branches in the northern and central parts of the Ayeyarwady River valley (Sagaing, Mandalay Magway), and in the more distant states of Shan, Mon, and Tanintharyi. Geographical concentration decreased slightly as a result, with 21% of branches now located outside of the four original main regions.

This pattern of spatial development suggests that labor shortages and wage rate increases (the main drivers of mechanization) occurred first in agricultural zone surrounding Yangon, and began to be transmitted to remoter and less dynamic areas only after 2013.

Figure 2. Number and Location of Machinery Suppliers, 2010, 2013, and 2016



On the supply side, it also suggests that businesses have sought to extend their customer base by opening new branches in ‘hinterland’ areas as the earliest markets in the country’s agricultural heartland have matured.

Growing Sales

The rate at which new machinery supply businesses in Mingalar Thanmyint compound were established between 2012 and 2016 was far exceeded by growth in the volume of sales made. These increased by a massive 535% over this period, rising from 21,223 to 134,700 units (Figure 3)².

Sales of almost all categories of agricultural machinery increased during this period, but sales of large machines (four-wheel tractors and combine harvesters) grew at a particularly rapid rate after 2014. The volume of sales of units of small machines was far greater however.

Combine harvester sales grew nearly 6,000% in four years, rising from 40 in 2013 to 2,372 in 2016, with 90% of this growth taking place in 2015 and 2016 alone (Figure 3). Sales of four-wheel tractors increased almost 1,100% between 2012 and 2016, up from 275 to 3,200.

These large machines have already begun to replace smaller ones. Sales of threshers dwindled by 79% from a high of 220 in 2014 to 46 in 2016, while the annual growth in sales of reapers peaked in 2015 after three years of brisk growth and fell thereafter. Four-wheel tractors also appear to have eaten into sales of two-wheel tractors, sales of which plateaued in 2014/15.

The average number of sales staff working for dealerships in the cluster grew by 43% between 2013 and 2016, corresponding to the increasing volumes of sales made.

Growing Product Assortment

The product assortment offered by machinery suppliers has diversified over time as competition between suppliers has increased.

² This figure excludes sales made by branches outside the cluster. Sales volumes for 2016 are extrapolated, based on sales made during the first six months of 2016. Key informants confirmed that sales during the first and second half of the year are similar.

Figure 3. Sales of Selected Machinery by Dealerships in Mingalar Thanmyint Compound (2012-2016)

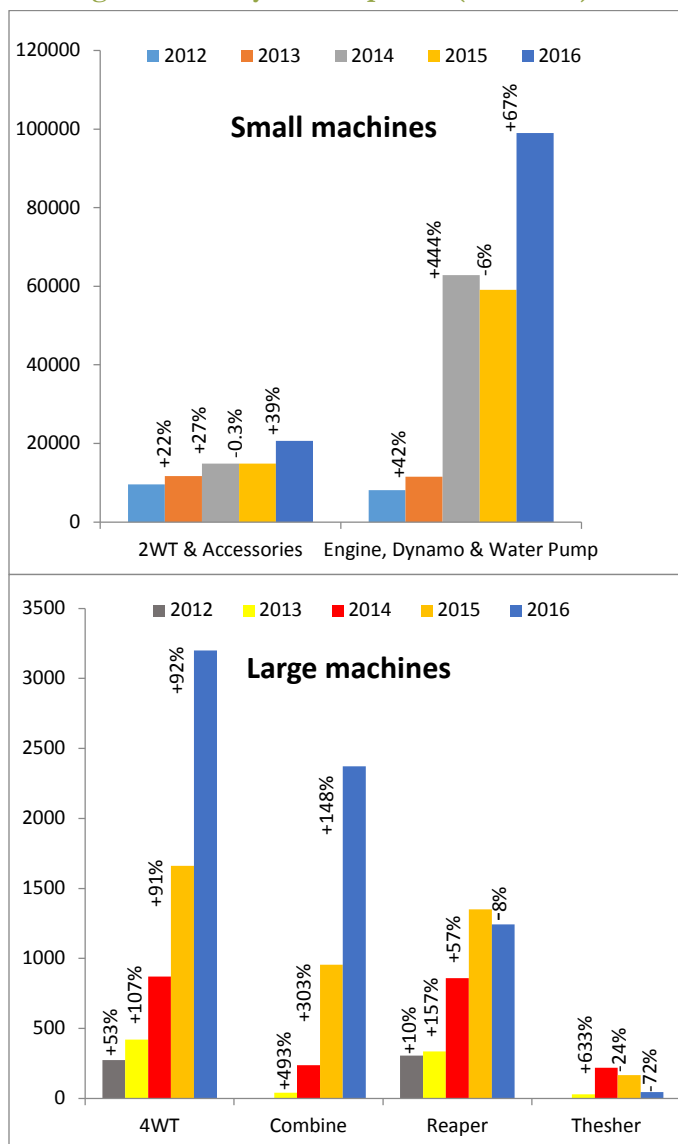
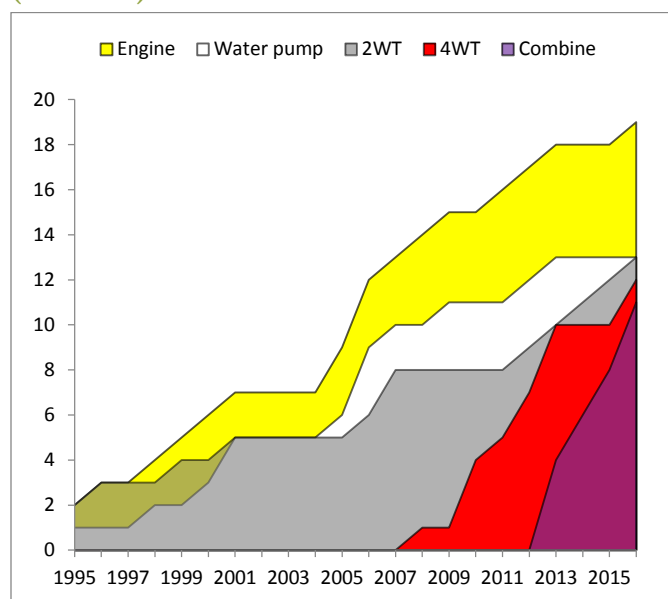


Figure 4 illustrates the cumulative number of dealerships in the Mingalar Thanmyint cluster selling different categories of machinery from 1990 to 2016. Small machines (water pumps, engines, and two-wheel tractors) were the first to be sold. The number of suppliers stocking these grew quickly from 2005. More than two thirds of businesses in the cluster stocked them in 2016, reflecting high levels of demand and widespread use.

The number of dealerships stocking four-wheel tractors increased sharply from 2009, followed by combine harvesters, introduced in 2012 and growing rapidly thereafter, with around 40% dealers selling both in 2016.

Five dealers in the cluster stocked rice planters in 2016, though few sales of have been made to date.

Figure 4. Cumulative Number of Dealers in Cluster Selling Machinery, by Type of Machine and Year (1990-2016)



The vast majority of agricultural machinery sold in Myanmar is imported from neighboring China and Thailand. Eighty-seven percent of all small machines (one-wheel tractors, two-wheel tractors, engines, dynamos, water-pumps, and roller boats) sold by dealers in the cluster in 2016 originated from China.

Fifty-seven percent of four-wheel tractors and combines originated from Thailand. Only a few types of machines were imported from other countries. For example, 60% of reapers were imported from Vietnam and 19% of four-wheel tractors from India.

Machinery imported from Thailand is generally considered of better quality than that from China, and is more expensive. The average cost of a four-wheel tractor in 2016 ranged from MMK 14.9 million (\$13,000) for Chinese to MMK 30 million (\$25,000) for Thai-manufactured brands. The price of combine harvesters ranged from MMK 19.9 million (\$16,000) to MMK 37.2 million (\$31,000) for Chinese and Thai-made brands respectively. The latter include Kubota, which is by far the most popular brand of combine harvester sold in Myanmar.

Chinese two-wheel tractors average 1.6 million MMK (\$1,300). Trawlajee with Myanmar-made frames and Chinese chassis and engines cost 4.9 million MMK (\$4,000). Trawlajee are normally distributed by dealers under their own brand names.

Dynamos, water pumps, two-wheel tractor attachments, and combines are mainly imported via border trade (overland). For most other machines, the shares imported by border trade and by sea (through the port of Yangon) are roughly equal.

Growing Financial Services

Hire-purchase arrangements have played a key role in facilitating adoption of agricultural machinery. There are two forms of customer finance available: 1) Direct financing from machinery dealerships; 2) Financing from banks and other commercial financial institutions.

In both cases, customers make an initial down payment on the item they intend to buy. In the case of direct financing by dealerships, the remainder of the balance is paid by the customer to the dealership, in installments with interest, over a fixed period. In the case of hire purchase arrangements made through banks, the machinery dealership provides collateral to the bank to guarantee the customer's loan, the bank pays the balance of the loan to machinery dealership, and the customer repays the loan to the bank over a fixed period with interest.

Half of the agricultural machinery dealerships surveyed offered at least one type of financing. Specifically, seven dealers (26% of the total) offered both types of financing, five dealers (18%) offered financing through banks only, and three dealers (11%) provided only direct financing.

Hire-purchase agreements with banks have played a central role in facilitating the growth of machinery sales described above. These only became common in 2013, but by 2016 accounted for the majority of purchases of combine harvesters (77% of all sales) and four-wheel tractors (68%) (Figure 5).

Capital constraints faced by machinery supply businesses mean that sales of large machines could not have grown to the extent that they have on the basis of direct financing alone: machine dealerships provided direct finance for only 5% and 2% of four-wheel tractor and combine harvester sales, respectively in 2016 (Figure 5).

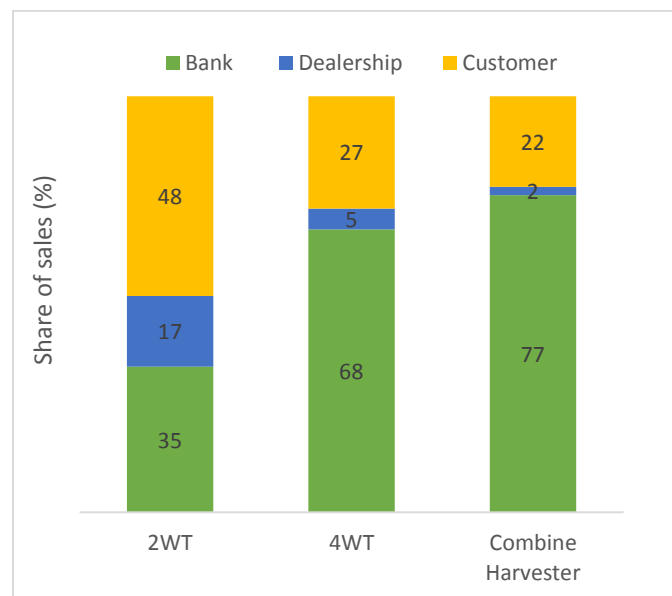
CONCLUSIONS

Results from our supply-side survey of 27 agricultural machinery dealerships in Myanmar's largest cluster of these businesses mirror those from an earlier demand side survey of machinery users in townships close to the city.

Adoption of machinery began with small, low-cost machines such as engines, dynamos, water pumps, and two-wheel tractors. The adoption of large-scale machines (combine harvesters and four-wheel tractors) is a more

recent phenomenon, accelerating particularly from 2013 onwards.

Figure 5. Share of Sales Made In 2016, by Source of Finance



Combine harvesters have already begun to replace smaller single-purpose machines (threshers and reapers) for harvesting. Demand for two-wheel tractors for land preparation remains high, but the adoption of four-wheel tractors has begun to eat into this market.

Evidence of widespread mechanization is revealed by growth in the number of machinery supply businesses within the cluster and their branches throughout the country, as well as by spectacular growth in the volume and value of sales made by branches located in the cluster. The former increased by more than 500% from 2012 to 2016 alone.

Particularly after 2013, there has been geographical expansion of branches beyond the Delta and lower Dry Zone to more distant states and regions. This suggests that the core market is maturing, driving suppliers to seek to open up new markets, and that agricultural wages rates — a key driver of mechanization — are beginning to rise in areas distant from the country's main urban centers.

Hire purchase arrangements financed by banks have played a pivotal role in facilitating the adoption of agricultural machinery; particularly combine harvesters and four-wheel tractors. Beginning only in 2013, this mode of financing already accounts for a large majority of sales of these items, partially overcoming liquidity constraints that would otherwise prevent dealerships from providing direct financing to their customers at sufficient levels. These

financing arrangements have also fueled the rise of rental markets for machinery, enabling further mechanization to take place.

Reference

Win and Thinzar. 2016. *Agricultural Mechanization and Structural Transformation in Myanmar's Ayeyarwady Delta*. Michigan State University Food Security Policy Project Research Highlights No. 2. East Lansing, Michigan: Michigan State University.

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