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How Have Foreign Exchange Market Distortions and Conflict Affected Agricultural Production Incentives in Myanmar?

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ABSTRACT

Fluctuations in agricultural prices pose significant challenges for fragile and conflict-affected economies due to their critical role in ensuring food security. This study examines changes in agricultural prices at the export, wholesale, and farm level in the case of Myanmar, which experienced a surge in conflicts from 2021 onward, following a military coup. The major findings are as follows:

- Regarding macroeconomic impacts, the military government implemented a dual exchange rate system, maintaining a fixed exchange rate significantly below the market rate and effectively imposing an across-the-board export tax on all export commodities of approximately 24 percent between August 2022 and August 2024. This policy particularly affects rice, Myanmar's main staple and a key export crop.
- The scarcity of foreign exchange due to this dual exchange rate system increased the costs of imported inputs. It is estimated that prices of inorganic fertilizers – farmers' most important commercial input – saw an increase of 10 percent compared to the price in Thailand since the start of the dual exchange rate system.
- Regarding domestic trade effects, regions with the highest insecurity exhibited similar agricultural output prices but higher input costs, resulting in reduced farm profitability compared to more secure regions. However, the magnitude of these effects is relatively small, with estimated increases in input prices due to insecurity ranging from one to six percent. Insecure areas also show more often a lack of input availability.
- Farmers who reside in insecure areas reported between one and six percentage points higher lack of access to agricultural inputs – fertilizer, agrochemicals, mechanization, and seed - in their communities. The relatively small effects of insecurity on input and output markets suggest a degree of resilience in the private sector's ability to maintain trade under conflict conditions.
- The biggest effect on input markets is seen in the case of agricultural labor. Depending on the measure used, farmers in the most insecure areas had a 7 to 15 percentage points higher likelihood of reporting lack of access to agricultural laborers compared to the most secure areas.
- The exchange rate policies are found to have been much more harmful for farmers' incentives than the domestic trade effects, even for the most conflict-affected areas, indicating the importance of considering macroeconomic effects for agricultural incentives in Myanmar.
- Despite the significant disincentives brought about by conflict, the agricultural sector has shown surprising resilience over the recent conflict period, seemingly linked to advantageous international price developments for farmers: international rice prices increased by 27 percent while urea prices decreased by 52 percent between August 2022 and May 2024.
- While these international evolutions have partly mitigated the impact of the conflict on farmers' profitability, the impacts of these price developments on consumers in Myanmar have, however, been severe. An analysis of rice retail prices in Myanmar over the last two and half years show that they have more than tripled and that the overall costs of the common diet more than doubled. A failure of nominal income to keep pace with this food price inflation led to an increase in poverty by 10 percent from the end of 2022 to the end of 2023.

1. INTRODUCTION

The impact of conflict on incentives for the agricultural sector is often a significant concern due to its role in ensuring vital food supplies during turbulent times. Faced with a significant economic downturn, international sanctions, and escalating budgetary demands for war efforts, the finances of the military government became severely strained (World Bank 2023). Consequently, in mid-2022, it implemented a stringent system of trade restrictions, by limited access to foreign exchange and by constraining import and export license requirements, among others. Most importantly, it also established a dual exchange rate framework, maintaining an official exchange rate well below the market rate and effectively imposing an export tax. It has been estimated that the rent due to this exchange rate policy was larger than the state's natural gas earnings (Myanmar's most important export products) and exceeded the combined value of income and commercial taxes in the country (Bissinger 2024).

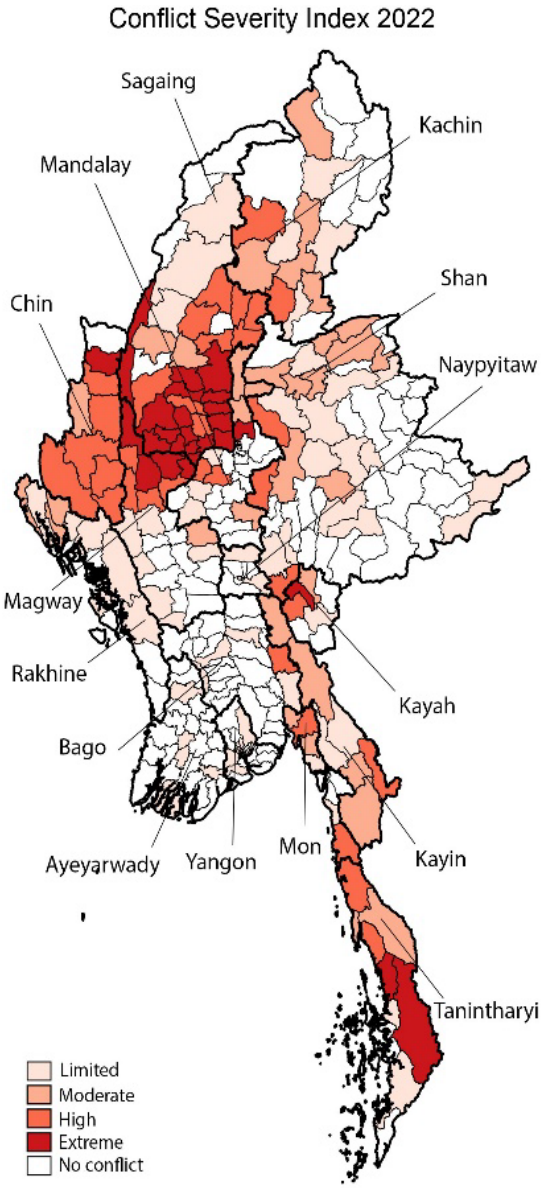
This policy notably impacted rice, Myanmar's staple crop and a key export. Local wholesale prices were approximately 24 percent lower over the period studied – August 2022 to June 2024 – due to this policy. Furthermore, the scarcity of foreign exchange resulting from this policy led to increased costs of imported inputs, particularly inorganic fertilizer and other essential agricultural inputs. We find that the wholesale prices of urea, the fertilizer most used in Myanmar, was 10 percent higher in Myanmar than in Thailand after the military coup, despite having similar prices prior.

In domestic trade, we find that relatively few farmers face a lack of agricultural inputs, even in the more conflict affected areas though lack of inputs were significantly higher in the latter areas compared to secure ones. Our findings further reveal that regions experiencing the highest insecurity exhibited – on average – similar agricultural output prices but faced significantly higher input costs, resulting in reduced farm profitability. However, the exchange rate policies are found to be much more harmful for farmers' incentives than the domestic trade effects of conflict, even for the most conflict-affected areas, seemingly due to the resilience of the private sector to trade even in these complicated environments. Despite the disincentives caused by the conflict, we also found high resilience of the agricultural sector during the conflict period, seemingly due to advantageous international price developments for farmers.

2. BACKGROUND

Myanmar has grappled with continuous conflict since the end of the Second World War (Myint-U 2007). However, the situation deteriorated significantly following the onset of widespread resistance to a military coup in early 2021. By 2022, ACLED (2023) classified Myanmar as one of the seven countries worldwide with extreme levels of conflict severity, while the Globalized Initiative against Transnational Globalized Crime (2023) ranked it as the country with the highest level of organized criminality in 2023. Nonetheless, not all regions of the country experienced violence to the same degree. Particularly, the southern region—referred to as the rice bowl—remained relatively less affected, whereas the Dry Zone in the central region, along with the southeastern and southwestern regions, bore the brunt of the conflict (Figure 1).

Figure 1: Conflict severity in Myanmar (2022)



Source: Authors

Given the multitude and escalation of conflicts in the country, the military regime – the Myanmar State Administration Council (SAC) – required significant additional funds. The World Bank (2024) estimated that 17 percent of the SAC's budget was allocated to military expenditures in 2023/24, an increase of seven percentage points compared to 2020/21, the year before the military takeover.[1] This represents an approximate increase from 3.0 to 4.1 percent of Myanmar's GDP. However, securing additional funds posed challenges amid international sanctions and the overall dwindling resources in the economy: the World Bank estimated that Myanmar's economy in 2023/24 was approximately 10 percent smaller than it had been before the pandemic and the coup (World Bank 2024). The military government therefore restricted imports – through a system of trade licenses – and implicitly taxed exports by imposing a dual exchange rate, a policy that it had also pursued previously.

[1] Other sources put it at a higher number. Irrawaddy (2024) reports that in the fiscal year 2023/24, nearly 30 percent of the public budget, approximately 2.7 billion USD, was allocated to the military—a reported surge of approximately 50 percent compared to the previous year's budget of 1.8 billion USD.

The government has frequently altered exchange rate policies since conflicts began, impacting agricultural export and import incentives (Table 1). For a detailed overview of these changes in exchange rate policies, see Appendix Table A.1. After the military takeover and prior to April 2022, no new exchange rate requirements were enforced. However, in April 2022, export earnings were mandated to be converted at the official Central Bank of Myanmar (CBM) exchange rate of 1,800 MMK to 1 USD. By August 2022, this rate was adjusted to 2,100 MMK, significantly lower than the unofficial (back) market value. Additionally, it was stipulated that 65 percent of foreign exchange earnings had to be converted at this fixed exchange rate for maritime exports in April 2022, and in August 2022, this policy was extended to both maritime and land border trade. In July 2023, this regulation was relaxed to 50 percent; in December 2023 to 35 percent; and in August 2024 to 25 percent. The remainder had to be exchanged at the market rate, and from July 2023 onwards at an online market trading platform, where rates typically fell below those of the unofficial market.[2]

Table 1: Major changes in exchange rate policies

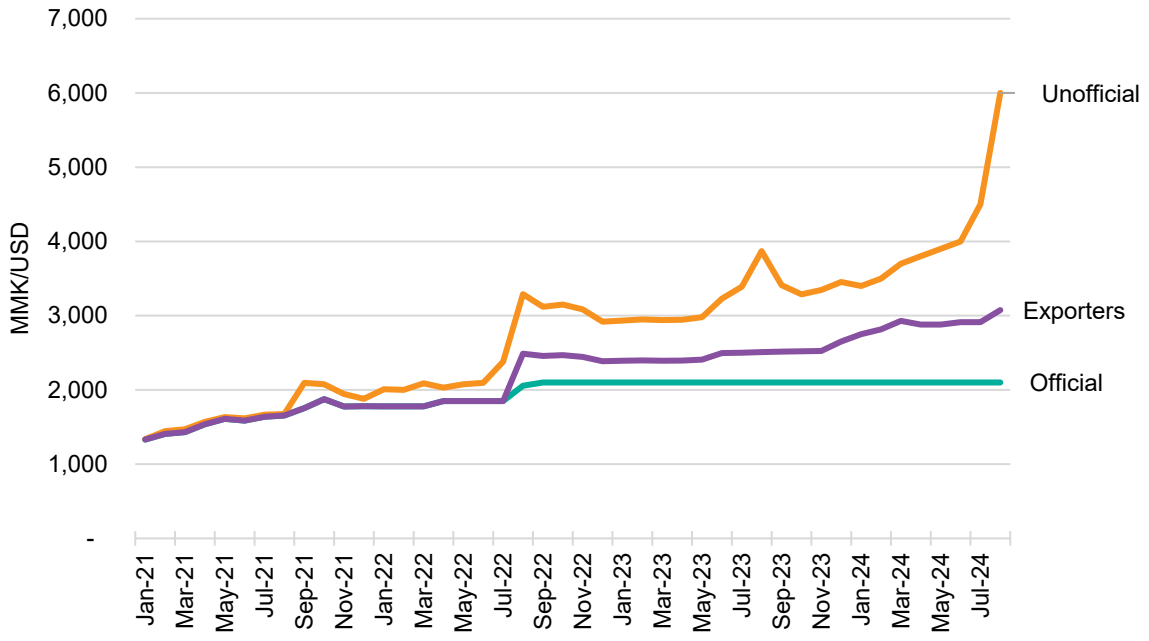
Date	Reference	Policies
5-8-2022	No. 36/2022	65% of export earnings to be converted to MMK at 2100 rate [start of 65:35 rate]
16-8-2022	FE-1/PaKa/1956	35 % of export earnings to be used within one month, either through “payment for self” or “sell to bank” or “sell to others”
18-11-2022	1415/2022	Rice export from MRF- export earnings (only margin) to be 65/35
2-12-2022	FE-1/PaKa/3602	Border trade to be 65/35
30-12-2022	FE-1/2861	For companies with more than 35% FDI, for agriculture and livestock exports, if its value added 100% exempt and if not 65/35.
28-2-2023	FE-1/3473	For rice, for both normal and border trade, all export earnings to be 65/35
13-7-2023	No. 15/2023	Export earnings to convert to MMK changes from 65% to 50%. Online trading rate introduced. Exporters need to convert portion of their earnings with this rate (no longer with unofficial rate) and the rest with CBM’s rate 2100. [start of 50:50 rate]
6-12-2023	No. 26/2023	Export earnings to convert to MMK changes from 50% to 35%. [start of 35:65 rate]
7-8-2024	No. 37/2024	Export earnings to convert to MMK change from 35% to 25%. [start of 25:75 rate]

Source: Myanmar State Administrative Council

To assess the policy's impact on international trade, we plot the official exchange rate, the effective exchange rate encountered by exporters, and the unofficial market rate (Figure 2). These rates illustrate the magnitude and fluctuations over time of the implicit tax burden borne by exporters. Comparing the unofficial rate with the effective rate, the average implied tax rate stood at 24 percent from August 2022 to August 2024. The highest tax rate was observed at the end of the period, with a difference of almost 50 percent in August 2024, reflecting the sharp devaluation of the MMK between June and August 2024. Importers faced exchange rates set by the online platform. However, trade on that platform has been constrained and they were therefore often obliged to rely on unofficial rates.

[2] The Central Bank of Myanmar set up an online Foreign Exchange Management System (FEMS) to manage foreign exchange transactions for import and export activities.

Figure 2: Exchange rate, January 2021–August 2024



Source: Authors' calculation based on data from the Myanmar State Administrative Council and World Bank

The rent from this exchange rate distortion has been a major source of income for the military government. Even if private banks conduct currency conversions, the ultimate beneficiary is reported to be the SAC (Bissinger 2024). The size of this rent on annual basis is estimated at 1.8 billion USD, which is identical to the military budget, larger than the state's natural gas earnings (Myanmar's most important export products), and exceeds the combined value of income and commercial taxes (Bissinger 2024).

3. DATA AND METHODOLOGY

3.1 Data

We use various primary and secondary data sources for our analysis. Firstly, we rely on secondary price data sources at the international and local wholesale level. For rice, we obtained prices from Myanmar Rice, a Facebook page operated by the Myanmar Rice Traders' Association (prices were collected from the major wholesale market of Wadan (Yangon)). The rice Free on Board (FOB) prices were published by the Myanmar Rice Federation on its webpage. Myanmar fertilizer prices were obtained from the Market Information System of the Ministry of Agriculture, Livestock and Irrigation, while relevant fertilizer prices from Thailand and Middle East were downloaded from the Thailand Office of Agricultural Economics and the World Bank[3] respectively. Local wholesale maize prices were obtained from the Mandalay Commodity Exchange Center, while FOB maize prices were sourced from the Yangon Region Chamber of Commerce and Industry.

Secondly, we use farm data from the Myanmar Agricultural Performance Survey (MAPS), a phone survey started in early 2022. The MAPS sample is a subset of crop farming households from the broader Myanmar Household Welfare Survey (MHWS). MAPS focuses on the agricultural activities of crop farmers, during the monsoon and the dry season, and is conducted twice a year. In each round, approximately five thousand farmers are interviewed. MAPS collects information on household characteristics, overall area cultivated, crops grown, rice production and sales, agricultural input and output prices, and the incidences of natural and other shocks. In combination with the development of household and population weights, the sampling strategy for these surveys allows for estimates that are nationally, regionally, and urban/rural representative (Lambrecht et al. 2023).

Table 2 gives an overview of the descriptive statistics of MAPS, averaged over the different monsoon rounds of the survey. Sixty-three percent of the main farm management decision makers were male; their average age was 45 years; two percent had no formal education while 57 and 35 percent had finished completed grades at the primary or secondary level respectively; and the average household size was 4.6 members. The average crop area owned is 6.4 acres, mostly cultivated by the household itself. Farmer typically take approximately half an hour to travel to the nearest township center, rice miller, or agro-input retailer. Most of the interviewed farmers were living in the Delta region or the Dry Zone, which are major agricultural production areas in the south and the middle of the country respectively.

Twenty-two percent of the farmers resided in an environment where they reported travelling with concerns for their security. Nine and 20 percent of the farmers reported to feel 'very insecure' and 'somewhat insecure' respectively. For ease of interpretation in our analysis, we convert the reported insecurity to an insecurity index going from 0 to 1 at the township level, with 0 indicating a very secure environment and 1 indicating a very insecure one. This index averaged 0.35 overall. It is to be noted that we have no data for the reported insecurity by farmers for the first monsoon period, which explains the lower number of observations for that variable compared to others.

[3] Urea prices were until March 2022 reported for Ukraine (Black Sea). Afterwards, they are FOB prices Black Sea.

Table 2: Descriptive statistics

	Mean	Median	Number of observations
Farmers characteristics			
Gender main farm management decision maker (1=male)	0.63		17,285
Age main farm management decision maker (years)	44.7	45	17,285
Education level farm management decision maker			
None (%)	2.3		328
Primary (%)	56.9		7,729
Secondary (%)	34.9		7,666
Other (%)	11.5		1,562
Household size (number)	4.65	4	17,285
Crop area owned (acres)	6.40	4	17,285
Crop area cultivated (acres)	6.22	4	16,745
Farmers' location			
Distance to nearest agro-input dealer (minutes)	40.9	30	17,285
Distance to nearest rice mill/huller (minutes)	29.8	20	17,285
Distance to nearest township center (minutes)	50.3	30	17,285
Location by agro-ecological zone (%):			
Hills and mountains	23.9		4,138
Dry Zone	39.9		6,889
Delta	30.5		5,267
Coastal areas	5.7		991
Insecurity			
Reported insecurity by farmers (%)			
Very insecure	9.3		881
Somewhat insecure	20.0		1,891
Secure	35.8		3,383
Very secure	34.9		3,298
Insecurity index (0=very secure; 0.33=secure; 0.66=somewhat insecure; 1=very insecure)	0.35	0.33	9,453
Travel with concerns for security (yes=1)	0.22	0.00	17,246

Source: Authors' calculations

Table 3 presents the prices of crop outputs and agricultural inputs – as well as the reported availability of these inputs – for the four monsoon seasons covered in the study. For output prices, we focus our analysis on two major market crops in the country: paddy and maize.[4] Prices for paddy rice and maize were recorded at the time of the survey. For agricultural input prices, we assess the price evolution of fertilizers, mechanization, and agricultural wages - the most important commercial inputs for farmers in Myanmar (Minten et al. 2024). Urea prices were reported by the farmers when purchased for monsoon cultivation, while prices for the other input costs (mechanization and agricultural wages) were the stated prices by farmers during the monsoon cultivation period in their community. We also asked farmers about challenges in acquiring agricultural inputs, including availability in their community.

Table 3 illustrates the substantial increases of agricultural prices over time, partly reflecting the rampant overall price inflation in the country, partly explained by the depreciation of the local currency; however, changes have also been influenced by international commodity price movements, as discussed later. Comparing the monsoon of 2023 with that of 2020, paddy rice prices

[4] Pulses are also a major cash crop in the country – they are the most important agricultural export – but the large variety of crops in that category makes it difficult to compare prices.

more than tripled while maize prices almost doubled. Input prices also increased sharply, with urea prices tripling and the costs for plowing doubling.[5] Agricultural wages of men and women showed the least increase of all prices, rising by almost 50 percent over the three years, significantly below overall food price inflation (MAPSA 2024b). Surprisingly, lack of agricultural inputs has been a relatively minor issue in the country despite the trade constraints due to conflict. Less than 10 percent of farmers mentioned a lack of availability of inputs, indicating the resilience of the private sector in delivering these inputs to the farming communities in Myanmar. The only exception is the lack of agricultural labor, mentioned by 18 percent of the farmers in the most recent monsoon.

Table 3: Prices and availability of agricultural inputs

	Monsoon 2020		Monsoon 2021		Monsoon 2022		Monsoon 2023	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Output prices (MMK/kg)								
Paddy rice	351	335	380	359	688	670	1124	1053
Maize	306	279	463	479	686	675	602	564
Inputs								
Reported lack of inputs (share of farmers)								
Fertilizer			0.10		0.07		0.04	
Agro-chemicals (pesticides, herbicides)			0.04		0.02		0.02	
Mechanization			0.06		0.03		0.06	
Seed			0.06		0.03		0.03	
Labor			0.17		0.14		0.18	
Input prices								
Urea (MMK/kg)	659	700	952	1,080	2,321	2,300	1,977	1,900
Plowing (MMK)	22,660	20,000	26,229	25,000	39,690	40,000	48,655	45,000
Combine harvesting (MMK/acre)							116,838	110,000
Wages men (MMK/day)	6,041	6,000	6,488	6,000	7,381	7,000	8,808	8,000
Wages women (MMK/day)	4,754	5,000	5,060	5,000	5,771	5,000	7,088	7,000
Number of observations*	3,891		3,891		4,892		4,611	
Number of townships	276		276		271		270	

*: Overall number of farmers interviewed; actual number of observations different for each variable.
Source: Authors' calculations

3.2 Methodology and Hypotheses

We compare international prices with local wholesale prices and subsequently contrast farm-level prices between secure and insecure areas. At the international level, we compare local wholesale prices with FOB prices or prices abroad. It is expected that wholesale prices for export crops will decline after the change in the exchange rate policy due to the lower effective exchange rate. However, the exact effect depends on the actual implementation modalities of this exchange rate policy. Given the lower exchange rates for exports compared to the market-clearing exchange rate, there is expected to be excess demand for foreign currency. This situation can lead exporters to incur losses to access foreign exchange to later recoup profits through import activities (Tamru et al. 2021; Anderson et al. 2008). Alternatively, if informal export and import markets cannot be sufficiently controlled, the change in the formal exchange rate policy would have a reduced influence on local prices. The results of this analysis are discussed in Section 4.

[5] Prices for combine-harvesting were only asked in the last monsoon and we can therefore not compare trends over time.

To measure effects on the input and output prices at the farm level, we estimate the following model:

$$P_{hct} = \alpha + \beta I_{hct} + \gamma X_{hct} + \omega_s * \delta_t + \theta_v + \varepsilon_{hct}$$

The location of the farmer is measured at three levels: the community *c*, the township *v*, and the state/region *s* where the farmer resides. The dependent variable P_{hct} measures the price - or availability - of agricultural inputs or outputs at time *t* in community *c as* reported by household *h*. The I_{hct} variable is our main study variable, measuring insecurity in community *c* at time *t*. We control for a number of household and community characteristics by inclusion of the vector X_{hct} as those might influence availability of inputs or reported agricultural prices. $\omega_s * \delta_t$ is the interaction of yearly dummies with state/regions, controlling for differential price trends across state/regions during the period studied. We account for time-invariant unobserved heterogeneity at the township level by including township fixed effects, θ_v. ε_{hrt} is an error term measuring unobserved factors. Standard errors are clustered at the township level, as sampling done at that level. The results of this analysis are discussed in section 4.

4. INTERNATIONAL TRADE

We begin by examining the evolution of rice prices in major wholesale markets and compare these with international prices. Myanmar is a major exporter of rice – the 5th biggest in the world – and its local markets are well connected to international ones. We rely on the prices of the common Emata variety and compare those with relevant local wholesale market prices for the period January 2021 to June 2024 (Figure 3). FOB prices were significantly higher than prices on the local wholesale market before the change in the exchange rate regime (August 2022). This difference primarily reflects the costs associated with accessing international markets (due to required certifications, extra processing[6], and other export costs). Since the start of the dual exchange rate regime, the difference between the FOB and wholesale price has almost tripled – an increase of 179 percent on average (Table 4).

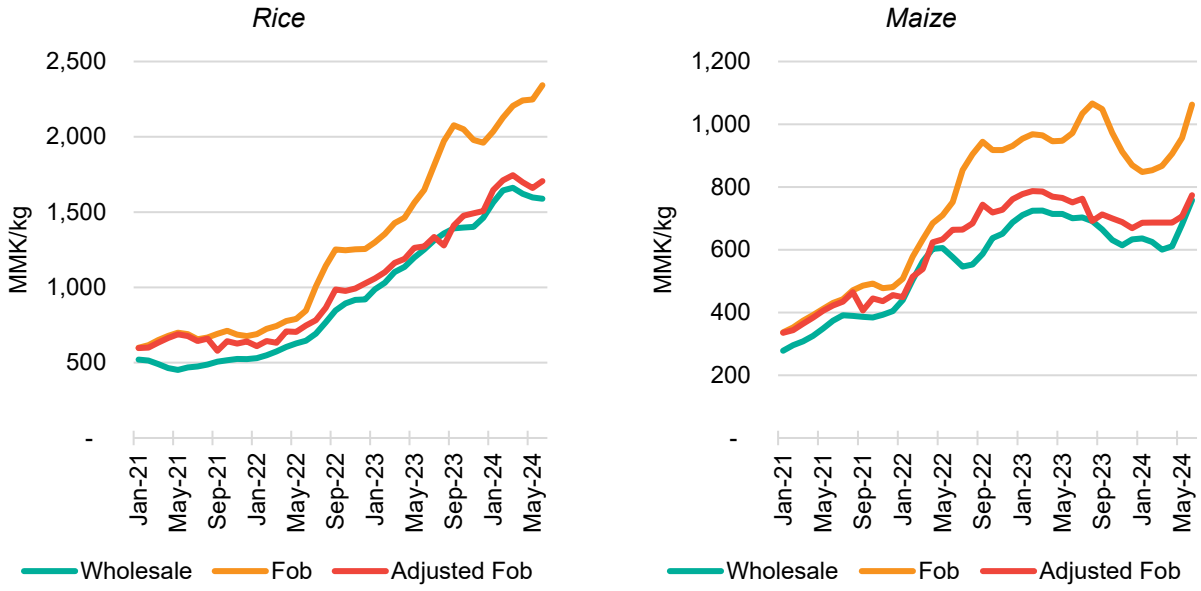
An "adjusted" FOB price, where effective formal exporter exchange rates are considered, also increases but to a lesser extent than the FOB price (Figure 3). The differences between local wholesale prices and adjusted FOB prices were relatively stable, even significantly declining by 54 MMK/kg, over the period considered. This stability indicates that local prices were influenced by these formal exchange rate relationships and that the military government was able to largely control the mitigating effects observed in other contexts. We note that margins between the adjusted FOB and local prices at the beginning of the period were slightly higher, possibly due to the increased trading costs during the COVID-19 period.[7]

We perform the same calculations for maize, another important and booming export crop (MAPSA 2023). In this case, the margins between FOB prices and local wholesale prices have also increased significantly since August 2022, more than tripling since (Figure 3; Table 4). Again, we observe a close link between the adjusted FOB price – considering the exchange rate rules – and the local wholesale price, indicating that these adjusted FOB prices primarily guided exports. The average differences between the adjusted FOB prices and wholesale prices since August 2022 are remarkably similar for maize (60 MMK/kg) and rice (64 MMK/kg) (Table 4).

[6] Rice for export is typically polished twice while local rice is only polished once.

[7] Despite this implicit export tax because of the exchange rate regime, we still see significant inflation of rice prices on the local wholesale market in Yangon, with prices of rice being more than three times higher in the middle of 2024 compared to the beginning of 2021.

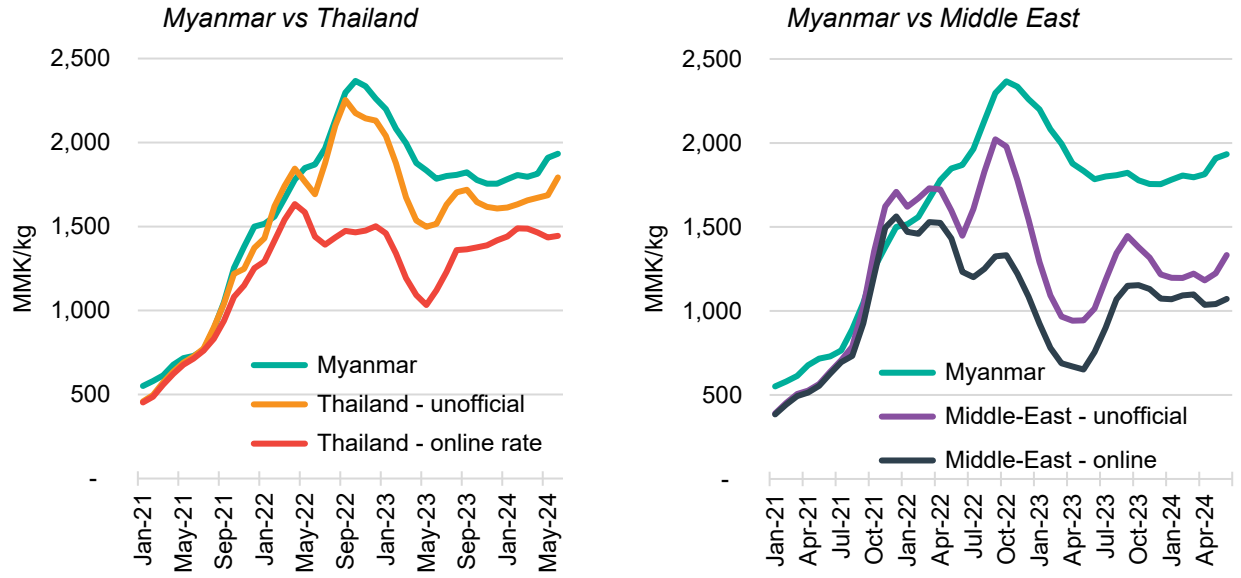
Figure 3: Rice and maize prices (wholesale and FOB at market exchange rate; 3-month moving average)



Source: Authors' calculations

Secondly, we assess the costs of imported inputs. We focus on inorganic fertilizers – the most important commercial input for farmers in Myanmar (Minten et al. 2024) – and specifically on urea, the most widely used fertilizer in the country (FAO 2024). Due to the lack of FOB import prices, we compare the reported wholesale prices with those reported in Thailand and the Middle East, the latter the primary source of imported fertilizers in the country. We convert international prices to Myanmar kyat (MMK) using the unofficial rates and "online trade" exchange rates. We find that fertilizer prices in Myanmar were mostly aligned with international prices – both from Thailand and the Middle East – until the beginning of 2022, when a significant gap began to emerge. Using official rates, the margins increased substantially, tripling since August 2022 (Table 4). We also observe significant gaps when using unofficial rates, indicating rising import costs in the country as well as potential rents for those able to import at the official rate.

Figure 4: Urea prices (Thailand, Middle East, and Myanmar wholesale - 3-month moving averages)



Source: Authors' calculations

Table 4: Evolution margins FOB and local prices

	Rice margin		Maize margin		Fertilizer margin	
	FOB minus Wholesale MMK/kg	Adjusted FOB minus Wholesale MMK/kg	FOB minus Wholesale MMK/kg	Adjusted FOB minus Wholesale MMK/kg	Wholesale minus Thai official MMK/kg	Wholesale minus Thai unofficial MMK/kg
January 2021 - July 2022						
Mean	176	118	88	54	50	161
Median	173	95	73	45	42	102
August 2022 - July 2024						
Mean	493	64	288	60	162	580
Median	445	66	269	60	185	560
January 2021 - July 2022						
Mean	176	118	88	54	50	161
Median	173	95	73	45	42	102
Difference two periods						
Mean	316	-54	200	6	112	419
T-test (two-tailed) - probability	0.00***	0.00***	0.00***	0.21	0.01**	0.00***
Change in %						
Change in mean (%)	179	-46	226	11	225	260
Change in median (%)	156	-30	267	32	339	449

Source: Authors' calculations; *** p<0.01, ** p<0.05, * p<0.1, no stars=not significant..

This comparison of international and local prices indicates that the exchange rate regulations have created important disincentives for the agricultural sector. On the output side, the dual exchange rate system resulted in an implicit export tax of 24 percent. On the import side – if we assume that Myanmar fertilizer prices would have stayed at similar levels as in Thailand, as they were before the military take-over – our calculations indicate an average additional increase of 10 percent of local urea prices compared to Thailand since the change in exchange rate policy.

5. DOMESTIC TRADE

We assess the associations of agricultural output prices, availability of inputs, and agricultural input prices, specifically evaluating the role of self-reported insecurity by farmers. We first look at both paddy and maize prices and run the model described in Section 3. In the case of paddy, we add a short-grain dummy in addition to the variables mentioned. Short-grain varieties (Paw Hsan Hmwe) in Myanmar typically have lower yields, are higher-valued, and are more consumed by wealthier and urban populations. These varieties are almost exclusively oriented towards the local market. We do not have a similar quality indicator for maize, as it is a more homogeneous product than rice. Table 5 shows no significant correlations between insecurity and prices of paddy or maize for both measures of insecurity. The non-significant (average) results might be explained by differential effects for different communities. Those communities that export products might see a decrease in agricultural prices with increased insecurity, as it is harder for them to move products out, linked to costs at security checkpoints and higher transportation costs due to risk premia (Frontier 2022). On the other hand, food importing communities would face higher agricultural output prices given the higher costs of bringing commodities in.

Table 5: Associates of agricultural output prices for paddy rice and maize – measured in log (MMK)

	Paddy rice			Maize		
	Coeff.	Std. Error	Sign.	Coeff.	Std. Error	Sign.
Specification 1						
Travel with concern (yes=1)	0.007	0.006	n.s.	-0.008	0.030	n.s.
Controls						
Paddy rice variety	Yes			no		
Year x region/state dummies	Yes			Yes		
Household/community characteristics	Yes			Yes		
Township dummies	Yes			Yes		
R2	0.87			0.71		
Number of observations	9,358			1,427		
Specification 2						
Reported insecurity index (0 to 1)	0.014	0.012	n.s.	-0.006	0.021	n.s.
Controls						
Paddy rice variety	Yes			no		
Year x region/state fixed effect	Yes			Yes		
Household/community characteristics	Yes			Yes		
Township dummies	Yes			Yes		
R2	0.68			0.63		
Number of observations	5,152			783		

Source: Authors' calculations; *** p<0.01, ** p<0.05, * p<0.1, n.s.: not significant.

Secondly, we look at agricultural inputs. The associations of perceived insecurity and the lack of agricultural inputs show a significant effect for 8 out of the 10 tested coefficients (Table 6). However, the effect is generally small. Farmers residing in insecure areas reported a lack of agricultural inputs in their communities that was between one and six percentage points higher. The strongest correlations are seen with fertilizer (three and six percent for the travel with concern variable and the perceived insecurity variable), while the smallest effects are noted with seed. Farmers in Myanmar often rely on local seeds obtained from local input retailers and other farmers, and it seems that these markets have been least affected by insecurity. A notable exception is seen in agricultural

labor, where farmers in the most insecure areas had a 7 to 15 percentage points higher likelihood of reporting lack of access to agricultural laborers compared to the most secure areas.

Thirdly, we look at the prices of agricultural inputs. Insecure areas are in general associated with higher input costs, as all 10 estimated coefficients show a positive sign (Table 7). Only 6 of the 10 coefficients are significant at conventional statistical levels. However, the effects of insecurity are surprisingly small as estimated coefficients of the correlation of insecurity with an increase in the logarithm of agricultural prices vary between one and six percent. The highest associations are found in combine-harvesting, where prices in insecure areas are three to seven percent higher than in secure areas. Plowing costs were not significantly affected, possibly because local tractors are often available in the community, while combine-harvesters must be brought in from further away. Urea prices were approximately two percent higher in insecure communities. While wages are higher in insecure areas, the associations are relatively small (one percent higher in the case of the travel with concern variable and four percent in the case of the reported insecurity)

Table 6: Associates of the lack in availability of agricultural inputs – Linear Probability Model

	Fertilizer			Agro-chemicals			Mechanization			Seed			Labor		
	Coeff.	Std. Error	Sign.	Coeff.	Std. Error	Sign.	Coeff.	Std. Error	Sign.	Coeff.	Std. Error	Sign.	Coeff.	Std. Error	Sign.
Specification 1															
Travel with concern (yes=1)	0.034	0.007	***	0.015	0.005	***	0.009	0.006	n.s.	0.007	0.005	n.s.	0.063	0.010	***
Controls															
Year x region/state dummies	Yes			Yes			Yes			Yes			Yes		
Household/community characteristics	Yes			Yes			Yes			Yes			Yes		
Township dummies	Yes			Yes			Yes			Yes			Yes		
R2	0.08			0.04			0.05			0.06			0.07		
Number of observations	10,198			11,112			10,602			11,112			10,529		
Specification 2															
Reported insecurity index (0 to 1)	0.060	0.011	***	0.023	0.006	***	0.042	0.008	***	0.017	0.007	**	0.147	0.016	***
Controls															
Year x region/state dummies	Yes			Yes			Yes			Yes			Yes		
Household/community characteristics	Yes			Yes			Yes			Yes			Yes		
Township dummies	Yes			Yes			Yes			Yes			Yes		
R2	0.09			0.05			0.05			0.05			0.09		
Number of observations	7,288			8,194			8,194			8,194			8,194		

Source: Authors' calculations; *** p<0.01, ** p<0.05, * p<0.1, n.s.: not significant

Table 7: Associates of agricultural input prices – measured in log (MMK)

	Urea			Plowing			Combine-harvesting			Wages - males			Wages - females		
	Coeff.	Std. Error	Sign	Coeff.	Std. Error	Sign.	Coeff.	Std. Error	Sign.	Coeff.	Std. Error	Sign.	Coeff.	Std. Error	Sign.
Specification 1															
Travel with concern (yes=1)	0.022	0.008	***	0.008	0.007	n.s.	0.034	0.017	**.	0.013	0.005	**	0.006	0.005	n.s.
Controls															
Year x region/state dummies	Yes			Yes			Yes			Yes			Yes		
Household/community characteristics	Yes			Yes			Yes			Yes			Yes		
Township dummies	Yes			Yes			Yes			Yes			Yes		
R2	0.73			0.65			0.24			0.53			0.54		
Number of observations	9,575			12,714			2,198			14,289			14,260		
Specification 2															
Reported insecurity index (0 to 1)	0.020	0.013	n.s.	0.025	0.015	n.s.	0.067	0.023	***	0.035	0.009	***	0.036	0.010	***
Controls															
Year x region/state dmmies	Yes			Yes			Yes			Yes			Yes		
Household/community characteristics	Yes			Yes			Yes			Yes			Yes		
Township dummies	Yes			Yes			Yes			Yes			Yes		
R2	0.20			0.38			0.24			0.47			0.49		
Number of observations	5,362			7,364			2,194			8,507			8,490		

Source: Authors' calculations; *** p<0.01, ** p<0.05, * p<0.1, n.s.: not significant

6. DISCUSSION

The results indicate that conflict and exchange rate policies have significantly worsened both international and local trade incentives for agricultural output and inputs. Exchange rate policies have led to notably lower output prices and higher input costs. While local conflict has not, on average, affected farmers' output prices, it has impacted on the availability and cost of agricultural inputs. However, the local effects of conflict appear to be relatively small in magnitude. This suggests that the private trading sector has demonstrated resilience in maintaining the availability of inputs in most regions of the country.

Despite the significant disincentives brought about by conflict, the agricultural sector has shown surprising resilience: (1) MAPSA (2024a) reported that average yields during the 2023 monsoon were only four percent lower compared to the 2020 monsoon; (2) USDA (2024) noted a six percent reduction in national paddy production in 2023/2024 compared to three years earlier; (3) ADPC (2024) relied on satellite data to estimate a six percent reduction between the 2021 and 2023 monsoons in rice cultivation area for the most important states/regions; (4) Agricultural exports remained relatively stable when comparing the 2023/2024 period to 2020/2021 (World Bank, 2024).

This resilience can seemingly be partly attributed to international market developments. Between August 2022—when the dual exchange rate policy was introduced—and May 2024, international rice prices increased by 27 percent, as indicated by the FAO All Rice Price Index.[8] In contrast, international urea prices declined by 52 percent during the same period, as measured by the Middle East FOB price.[9] These combined developments led to significant improvements of agricultural incentives for paddy farmers in Myanmar.

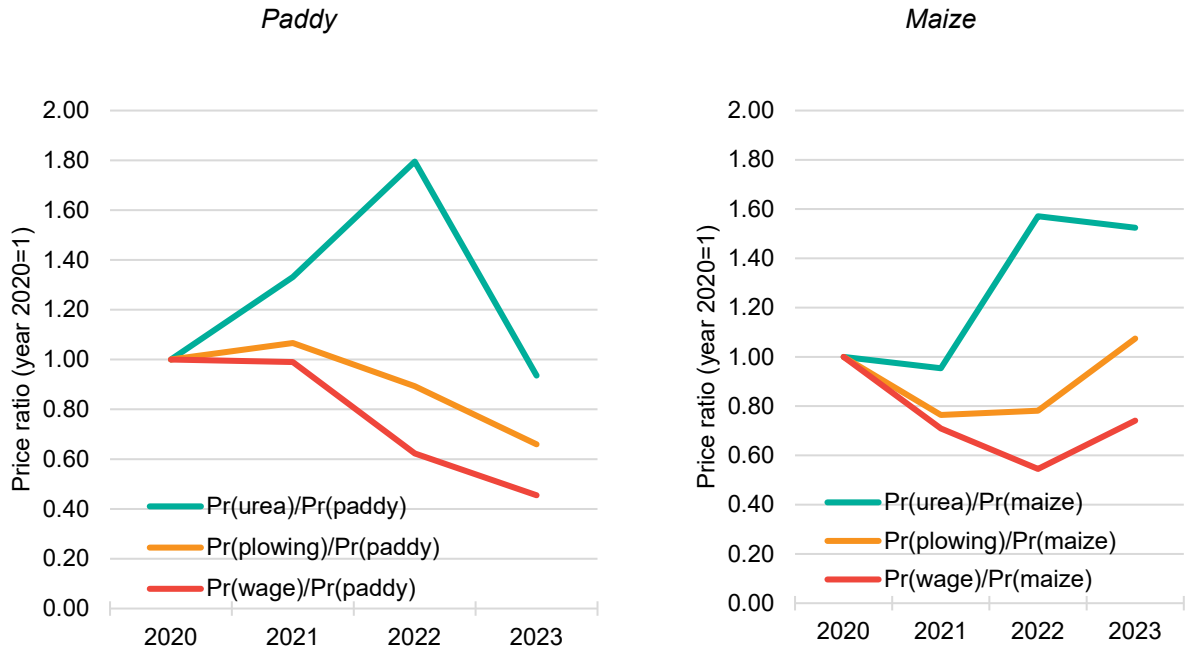
Figure 5 illustrates the trend in the price ratio of inputs to outputs at the local farm level over the last three monsoon seasons. A decline in this ratio relative to 2020 suggests improved farm profitability, whereas an increase indicates a worsening financial position for farmers. The data show improvements in all three indicators for paddy over the last three years, benefiting paddy farmers. However, the situation is different for maize, where we see an increase for the urea and plowing costs over maize price ratio, indicating a worsening in profitability. This decline in this ratio can be partly explained by adverse international market conditions for maize, as prices in May 2024 were 32 percent lower than in August 2022.[10]

[8] https://www.fao.org/markets-and-trade/commodities/rice/fao-rice-price-update/en/

[9] https://www.worldbank.org/en/research/commodity-markets

[10] https://www.worldbank.org/en/research/commodity-markets

Figure 5: Price ratios of input costs over output prices – monsoon prices (the ratio for 2020 is set to 1)

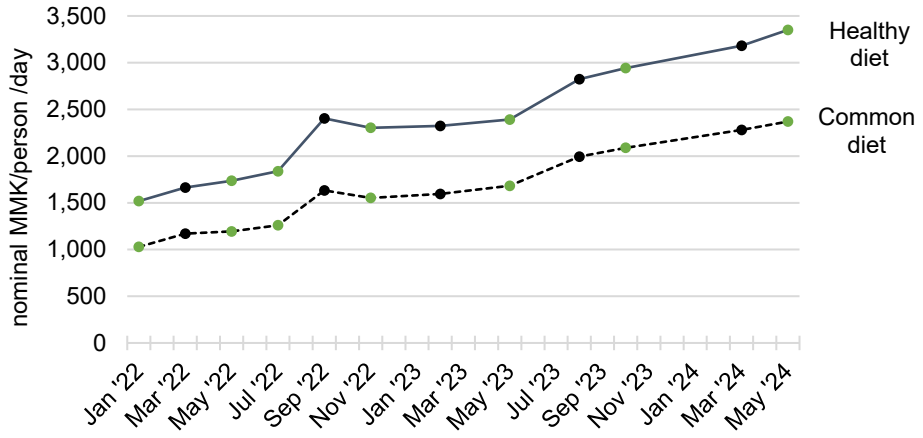


Source: Authors' calculations

While these international developments have partly mitigated the impact of the conflict on farmers' profitability, the effects of these price changes on consumers in Myanmar have been severe. An analysis of rice retail prices in Myanmar over the last two and half years show that they have more than tripled (Figure 3), and that the overall costs of common and healthy diets more than doubled (Figure 6). Incomes did not keep pace with these increases in food prices. For example, agricultural wages, adjusted for common diet costs, were 30 percent lower in Q2 of 2024 compared to the beginning of 2022 (MAPSA 2024b). Additionally, the kilograms of rice that a daily agricultural laborer could purchase with his wage dropped by almost half over the same period, leading to significant hardship for this vulnerable household group.[11] A failure of overall nominal income in the country to keep pace with this food price inflation led to an increase in poverty by 10 percent from the end of 2022 to the end of 2023 (MAPSA 2024c).

[11] To counter these inflationary pressures on rice prices, the SAC is imposing a system of reference prices for rice. They also imposed reference prices for fertilizer.

Figure 6: National trends in the cost of healthy and common diets, December 2021–June 2024



Source: MAPSA (2024b)

7. CONCLUSIONS

We investigate agricultural incentives—essential for good agricultural performance— by relying on international and wholesale prices, as well as unique, large-scale, nationally representative farm-level survey. Our findings indicate that insecurity significantly affects farm profitability, particularly through its impact on input availability and pricing. While output prices in conflict zones are, on average, comparable to those in more secure regions, agricultural inputs are notably less available, and when accessible, they are often sold at substantially higher prices. However, the magnitude of these effects is relatively small, with estimated increases in input prices due to insecurity ranging from one to six percent, suggesting a degree of resilience in the private sector's ability to maintain trade under conflict conditions.

In contrast, the effects of international trade policy changes, particularly the dual exchange rate policy introduced by the military regime, have been much more pronounced. This policy has effectively imposed an estimated 24 percent tax on output prices and a 10 percent tax on fertilizers, creating substantial disincentives for farmers.

Despite these challenges, the agricultural sector has demonstrated resilience during the crisis period, with no large reductions in the export and production of major crops, even in the most conflict-affected areas. This resilience can be partly attributed to the timing of the dual exchange rate regime's introduction and favorable international market developments. Paddy, the country's primary crop, and urea, the main fertilizer used, have both experienced beneficial price changes on the global market. International rice prices rose by 27 percent, while urea prices dropped by 52 percent. These international trends have helped offset the disincentives created by the conflict, contributing to a more profitable environment for farmers in these settings. However, these price developments have had a severe impact on consumers, as retail rice prices in Myanmar have more than tripled since the onset of the recent conflict, while incomes have not kept pace with this rise, leading to significant economic hardship.

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APPENDIX

Table A.1 Changes in exchange rate policies

Date	Reference No:	Policies
3-4-2022	No. 4/2022	States that banks holding an authorized dealer ("AD banks") are to convert income, whether from trade or non-trade sources, received from overseas into MMK within one working day of the receipt of those funds.
3-4-2022	No. 12/2022	Provides that foreign currency earned by Myanmar residents must be deposited in AD banks and converted into MMK within one working day of receipt.
20-4-2022	No. 1/69	MIC permitted businesses/ FDI businesses / SEZ businesses to be exempt from No. 12/2022.
20-4-2022	No. 5/2022	Clarifies that No. 4/2022 does not apply to the accounts of the Union Government or Ministries.
20-4-2022	No. 6/2022	Clarifies that No. 12 applies to Myanmar residents' incoming international transfer in foreign currency from abroad, outgoing transfer of foreign currency abroad and foreign currency held in foreign currency accounts with Myanmar banks.
26-4-2022	No. 7/2022	Exporters apply their Export Earnings to either "payment for self" or "sell to bank" within one month. Exports and imports under the China-Myanmar and Thailand-Myanmar border trade are not included in this.
5-8-2022	No. 36/2022	65% of export earnings to be converted to MMK at 2100 rate [start of 65:35 rate]
16-8-2022	FE-1/PaKa/1956	35 % of export earnings to be used within one month, either through "payment for self" or "sell to bank" or "sell to others"
16-8-2022	FE-1/PaKa/1957	The exempt companies/organizations to use the export earnings within one month, either through "payment for self" or "sell to bank" or "sell to others"
9-11-2022	FE-1/2059	In case of rubber, if it is value-added, 100% exempt and if not 65/35.
10-11-2022	FE-1/PaKa/3243	Border Trade- Export earnings to be used within one month, either through "payment for self" or "sell to bank" or "sell to others"
18-11-2022	FE-1/PaKa/3243	License for agriculture products (oilseeds, pulses, corn, rubber, livestock) will be issued only with USD/CNY/THB with 65/35
18-11-2022	1415/2022	Rice export from MRF- export earnings (only margin) to be 65/35
2-12-2022	FE-1/PaKa/3602	Border trade to be 65/35
30-12-2022	FE-1/2861	For companies with more than 35% FDI, for agriculture and livestock exports, if its value added 100% exempt and if not 65/35.
28-2-2023	FE-1/3473	For rice, for both normal and border trade, all export earnings to be 65/35
25-4-2023	SOP	Entrepreneurs, companies, organizations and individuals wishing to remit foreign currency of more than US$10,000 abroad must present evidence that they do not owe taxes.
13-7-2023	No. 15/2023	Export earnings to convert to MMK changed from 65% to 50%. Online trading rate introduced. Exporters need to convert portion of their earnings with this rate (no longer with unofficial rate) and the rest with CBM's rate 2100. [start of 50:50 rate]
14-8-2023	No. 11/2023	It designates THB as a permissible currency for international payments and settlement transactions. AD banks are now able to include THB in their cross-border financial operations.
12-9-2023	SAC law	The Law imposes income tax liability on the earnings of non-resident Myanmar citizens abroad, including salaries, that is payable in the same currency as the income received
6-12-2023	No. 26/2023	Export earnings to convert to MMK change from 50% to 35%. [start of 35:65 rate]
25-12-2023	No. 27/2023	Time frame to deposit the export earnings has been changed. Export to Asian countries- previous 45 days, new 30 days Export to outside Asia- previous 90 days, new 60 days
2-5-2024	DOT under MOC and SAC	DOT introduced Barter Transaction Arrangement (BTA) Procedure
7-8-2024	No. 37/2024	Export earnings to convert to MMK change from 35% to 25%. [start of 25:75 rate]

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