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## **Taxation and income distribution in Myanmar**

Application of a new computable general equilibrium (CGE)  
model

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**Abstract:** Despite major public finance reform efforts over the last decade, Myanmar public finances continue to be characterized by relative weakness in revenue collection, budget execution, and long-term sustainability. Myanmar is therefore in need of comprehensive public finance reform. Two top priorities of the Myanmar Sustainable Development Plan are to establish a fair and efficient tax system to increase government revenues, and to ensure effective public financial management. In this paper, we analyse the scope for fiscal tax reform to finance future Myanmar Union budget deficits and lower the need for central bank financing. Specifically, we employ a newly developed dynamically recursive computable general equilibrium model for Myanmar to analyse the economic efficiency and household income distribution impacts of employing four tax instruments, including the expansion of existing commercial taxes, customs duties, and corporate taxes, and the introduction of new secondary and tertiary education payroll taxes, to finance 2022–40 government budget deficits. Our results demonstrate that eliminating Myanmar government budget deficits could release savings for future capital accumulation and lead to net present value GDP gains, regardless of tax instrument, but also that real household welfare losses will be substantial and potentially persist throughout our 20-year horizon. While the payroll and enterprise tax instruments are identified as efficient and progressive, they are likely to suffer from weak tax bases, implying that commodity-focused tax instruments, including sales taxes and progressive but less efficient import tariffs, will need to continue to form the core of any comprehensive tax reform in Myanmar.

**Key words:** Myanmar, tax reform, economic efficiency, household income distribution

**JEL classification:** C68, E62, H2, O2

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## 1 Introduction

Two top priorities of the Myanmar Sustainable Development Plan (MSDP) are to establish a fair and efficient tax system to increase government revenues (policy 10), and to ensure effective public financial management (policy 1) (MPF 2018). In this context, it is vital that fiscal policies are effective, efficient, and properly targeted. However, in spite of extensive reform efforts since 2011, the Myanmar public finances continue to be characterized by relative weakness in several key areas, including revenue collection, budget execution, and long-term sustainability (IMF 2020; World Bank 2020).

Despite major public finance reform efforts over the last decade—including the establishment of a new treasury department and efforts to improve budgeting and planning and investment, debt, and revenue management (MOPFI 2017)—budget execution continues to rely on supplementary budgets. This essentially works as a second budget during the fiscal year, and has been singled out as potentially affecting budget discipline and credibility (World Bank 2020). Also, due to continued Union budget deficits, the Myanmar government has continued to resort to central bank financing, which is likely to have contributed to observed variations in consumer price index (CPI) inflation, and, by implication, to have led to inefficient inflation taxation.

Public deficit financing has so far relied on conditional foreign lending, and continuing high foreign savings inflows (in the form of foreign direct investment/FDI), to support the continuing Union budget deficits. However, in spite of recent discoveries of hydrocarbon deposits, the prospect of declining future state-owned enterprise (SOE) earnings from natural resource extraction is likely to put further pressure on the public finances (IMF 2020). The enactment of the 2016 Special Goods Tax Law contributed positively by simplifying existing tax procedures and mobilizing new indirect tax revenues, but the concurrent decline in direct corporate and personal income tax collection since 2015/16, combined with declining FDI inflows during the 2018/19 fiscal year, has exposed the fragile nature of Myanmar's public finances and once again led the government to resort to central bank financing.

In a global context, Myanmar has been singled out as having one of the smallest tax-to-GDP ratios in the world (IMF 2019), and calls have therefore been made for personal income taxes to be reformed in the short term, and for more comprehensive reform of commercial taxes and the special goods tax over the medium term (IMF 2020). In this paper, we focus on analysing the implications of tax reform in eliminating future Union budget deficits. Specifically, we will analyse the scope for the financing of future Union current account budget deficits via a set of four tax instruments: (1) increased commercial tax rates, (2) increased customs duty rates, (3) the introduction of a new payroll tax (on secondary and tertiary education labour wages), and (4) increased enterprise income tax rates.

We will rely on a dynamically recursive computable general equilibrium (CGE) model to assess tax efficiency and distributional impacts of four 'balanced budget' tax reform scenarios focused on each of the four above-mentioned tax instruments. Specifically, the CGE model will be calibrated to the existing 2017 Myanmar Social Accounting Model (SAM) (van Seventer et al. 2020), which allows us to analyse distributional impacts among rural/urban and farm/non-farm households, and among income quintiles. Furthermore, we construct two separate 2021–40 low and high Union budget deficit counterfactual growth paths against which our 2022–40 balanced budget tax reform scenarios will be assessed.

The rest of the paper is organized as follows: the next section provides a background discussion of current Myanmar public finance and fiscal weaknesses; this is followed by a methods section, which presents our simulation model framework and discusses the structure of the Myanmar economy; a results section which presents our analyses of the efficiency and distributional implications of our four tax policy scenarios; and a final section containing concluding remarks and discussion of our findings.

## 2 Background

The World Bank published its first Public Financial Management Performance (PFMP) report for Myanmar in 2013 (World Bank 2013), and this initiated the 2013–17 first stage of the Myanmar Public Financial Management Reform Program (PFMRP), led by the Ministry of Planning, Finance, and Industry (MOPFI) and focused on improving service delivery (MOPFI 2017). The first phase of this was completed in 2017 (see details in Table 1) and the 2018–22 second stage, with a focus on maximizing tax collection, broadening the tax base, improving tax compliance, and modernizing tax administration, was initiated in 2018 (Government of Myanmar 2020).

In follow-up to the 2013 PFMP report, the World Bank has recently published a 2020 PEFA assessment (World Bank 2020), which, based on a new set of 31 more forward-looking performance indicators, found several areas where there was still potential for further development (grade D on a scale A–E):

- 1 Most areas under the ‘management of assets and liabilities’ pillar, including public investment management (PI-11) and public asset management (PI-12);
- 2 Some areas under the ‘policy-based fiscal strategy and budgeting’ pillar, including fiscal strategy (PI-15) and medium-term perspective in expenditure budgeting (PI-16);
- 3 Some areas under the ‘predictability and control in budget execution’ pillar, including procurement management (PI-24) and internal audit (PI-26);
- 4 external audit (PI-30) under the ‘external scrutiny and audit’ pillar.

Based on an older set of 28 more execution-focused performance indicators, the 2020 PEFA report found remarkable progress in 18 indicators. However, the older indicators also indicated continuing weaknesses (grade D on a scale A–E) in several areas, including (1) extent of unreported government operations (PI-7); (2) competition, value for money, and controls in procurement (PI-19); and (3) effectiveness of internal audit (PI-21). In spite of progress since the last report, the indicators also showed continuing weaknesses (grade C on a scale A–E) in other key areas, including (1) effectiveness of measures for taxpayer registration and tax assessment (PI-14) and (2) effectiveness in collection of tax payments (PI-15) (World Bank 2020).

Table 1: Public financial management (PFM) reform achievements, 2013–17

Reform	Achievement
Established a treasury department	Established a treasury department under MOPFI in 2014 with responsibility for auctioning treasury bonds and treasury bills and keeping track of Union Fund accounts.
Updated financial rules and regulations	Established updated Financial Management Regulation which 'simplifies financial management procedures to facilitate more efficient public service delivery' (World Bank 2017)
Prepared a new public finance management act	Still in process
Implemented a medium-term fiscal framework	Medium Term Fiscal Framework (MTFF) established with World Bank assistance
Strengthened budgeting and planning	New procedures include (i) preparation of MTFF, and (ii) possibility of issuing current and capital expenditure ceilings to line ministries; budget and planning departments are working to align budgets and plans with the MTFF
Improved inter-government fiscal transfer system	Established the Intergovernmental Fiscal Relations division under the Budget Department in 2015 with responsibility for executing fiscal transfers to regions and states
Improved fiscal transparency	Annual publications of Budget Law, Citizen's Budget, year-end reports, and pre-budget statements
Improved macroeconomic forecasting	Training of planning department staff
Enhanced public investment management	Drafts of project appraisal and monitoring guidelines, project proposal forms, and monitoring forms; planned ministry and locality database construction
Improved cash and debt management	Training of treasury staff in cash management by International Monetary Fund (IMF), and in debt management by Asian Development Bank; auctions for treasury bills (2015) and bonds (2016) initiated; Public Debt Management Law (2016) and Medium-Term Debt Management Strategy (2017) published; Government Debt Annual Report initiated; attempt at operationalizing Debt Recording and Management System (DRMS)
Improved budget execution	Presidential directive on tender procedure issued (2017); draft of Public Procurement Law; regular treasury reports of consolidated fund accounts; training of Myanmar Economic Bank staff in handling of core banking system software
Implemented Myanmar customs reform and modernization	Amendments to Land Customs Act and Sea Customs Act approved (2015); Myanmar Automated Cargo Clearance System and Myanmar Customs Intelligence System implemented by Myanmar Customs Department (2016); preparations to launch a national single window and connect to ASEAN Single Window system (went live in December 2020)
Strengthened tax administration and revenue management systems	Function-based restructuring of Internal Revenue Department (IRD) and launch of Large Taxpayers' Office (2014) and Medium Taxpayers' Offices 1–3 (2015–16); five-year IRD strategic and reform plans (2014), launch of large (2015) and medium (2017) taxpayer self-assessment and Specific Goods Tax (2016); draft Tax Administration Procedures Law (2017); technical assistance from World Bank, IMF, and US Office of Technology Assessment
Strengthened external oversight	Joint Public Accounts Committee (JPAC) has scrutinized all PFM reform projects, budgets, and implementation reports with attention to public expenditure and financial accountability (PEFA)

	standards; Banking Sector Financial Reporting Standards Implementation Committee established; Office of the Auditor General has trained staff, produced financial audit manuals and guidelines, and improved timeliness of six-month and annual audit reports (annual reports submitted with nine-month lags)
Strengthened institutional capacity	Capacity-building for the purpose of carrying out the reform process, including English-language training by British Council and establishment of a PFM academy for delivery of a range of public servant skills training programmes
Implemented state economic enterprise reform	Reforms to turn state economic enterprises (SEEs) into joint ventures and corporations

Source: authors' construction based on MOPFI (2017).

Based on the older indicators, the 2020 PEFA report concluded that aggregate fiscal discipline had improved, but also that 'limited information on contingent liabilities and future costs of investments remain threats to the management of medium and long-term fiscal sustainability' and that most sector strategies 'continue to lack complete costing of investments and recurrent expenditure' (World Bank 2020). While the level of unreported government operations has reportedly been reduced, the systematic use of a supplementary budget, which essentially works as a second budget during the fiscal year, was also singled out as potentially affecting budget discipline and credibility, and as something which could explain relatively large observed changes in the composition of spending during fiscal years (World Bank 2020). Overall, the World Bank reports suggest that there are a number of structural weaknesses which remain within PFM in Myanmar, including in key areas such as registration and collection of tax payments, medium- and long-term fiscal planning, and budget execution.

In terms of Union budget revenues, the range of government current account revenues, making up 97–98 per cent of total domestic revenues, includes both tax and non-tax revenues (Table 2); and the fiscal revenues can be further separated into (1) direct taxes (including taxes on income and profit and taxes on the use of state properties) and (2) indirect taxes (including taxes on production and public consumption and customs duties).

Direct tax revenues stem mainly from income and profit taxes, covering four main types of taxes: (1) corporate income taxes, (2) withholding taxes, (3) capital gains taxes, and (4) personal income taxes. The corporate income tax rate is generally 25 per cent and is applied to companies registered under the Myanmar Companies Law 2017 and companies operating under permission from the Myanmar Investment Commission (including foreign-owned resident companies with an investment licence granted under the Myanmar Investment Law 2016). Importing and exporting companies are required to pay an additional 2 per cent advanced income tax on the assessed value of traded goods; however, this tax can be offset against annual corporate income tax payments. All non-resident foreigners are subject to a 2.5 per cent withholding tax, and all taxpayers (resident and non-resident) to a 10 per cent capital gains tax on the sale, exchange, or transfer of capital assets in Myanmar (except for upstream oil and gas assets, where special rules apply). Finally, the Union Tax Law of 2019 specifies that anyone with an annual salary above 4.8 million kyat (MMK) is liable to pay personal income tax at rates progressively rising in five-percentage-point steps from 0 per cent (<MKK2 million) to 25 per cent (>MKK30 million), after accounting for allowances including a basic 20 per cent allowance of the first MKK10 million and additional allowances for children, dependent spouse, and dependent parents living with the taxpayer (Kyu 2020). The other main source of direct tax revenues is property taxes (termed 'taxes on the use of state properties' in Table 2) which are levied on land and buildings ('premises') and governed and administered by

a variety of local laws and administrative organizations, including, for example, the Yangon City Development Law 2018, administered by the Yangon City Development Committee (Kyu 2020).

The main source of indirect tax revenues is production and sales taxes (termed ‘taxes on production and public consumption’ in Table 2); this covers three main types of taxes: (1) commercial taxes, (2) specific goods taxes (reform enacted in 2016), and (3) gem taxes. Commercial taxes are levied on four types of goods and services—local production and goods sales, importation of goods, trading, and provision of services—and all goods and services are taxed at 5 per cent except for 43 exempted goods (mostly agricultural crops and related products) and 33 exempted services. Specific goods taxes range from 5 per cent to 60 per cent and are levied on local production and goods sales, importation of goods, and trading of 14 specific goods, including cigarettes, tobacco leaves, cigars, etc.; beers, wine, and alcoholic beverages; wood logs and wood cuttings; vans, sedans, estate wagons, etc.; and kerosene, petrol, diesel, jet fuel, etc. Gem taxes range from 5 to 11 per cent and cover raw and finished gemstones, including jade, ruby, sapphire, diamond, and emerald (Kyu 2020). The other distinct, but smaller, source of indirect tax revenues is customs duties, which are levied under the Sea and Land Customs Act (last amended in 2018) at rates of up to 50 per cent (Kyu 2020). Other non-tax sources of government current account revenues include SOE earnings and other domestic receipts, including grants and interest receipts (Table 2).

As part of its efforts to reform the tax system, the Government of Myanmar has managed to reduce its global financing needs from 30 per cent (2015/16) to 26 per cent (2017/18) of the Union budget and to reduce the domestic financing needs (after accounting for direct external funding) from 23 per cent (2015/16) to 21 per cent (2017/18) of the Union budget (Table 2). In terms of GDP, the global/domestic deficits have been reduced from 5.3 per cent/4.0 per cent (2015/16) to 4.0 per cent/3.3 per cent (2017/18) (Table 2). While the relative progress between the 2015/16 and 2017/18 fiscal years is encouraging, the lack of progress in terms of the domestic funding deficit remains a major concern. Hence, the 2015/16–2017/18 reduction in ‘deficit before direct external funding’ has been mirrored by an almost exact reduction in direct external funding sources (including government foreign loans and government foreign grants and aid), implying that the domestic funding need has been reduced only from 23 per cent to 21 per cent of the Union budget.

In spite of a continuing high domestic financing need, the IMF has reported that central bank financing declined from high levels in 2015/16 to lower levels during the 2016/17 and 2017/18 fiscal years (IMF 2019). The reduced reliance on seignorage for Union budget deficit financing is likely to have contributed to the observed declines in CPI inflation (Table 2), and, by implication, to a reduced inflation tax—something which is likely to have also improved financial intermediation and the general efficiency of the Myanmar economy. However, the combination of unchanged domestic Union budget financing needs and declining central bank financing has been possible only because of continued external support in the form of conditional foreign lending, and, not least, due to continuing high foreign savings inflows in the form of continuing high net FDI inflows. Hence, while FDI inflows amounting to 4.8 per cent of GDP, combined with better-than-expected budget execution, allowed the government to minimize central bank financing during 2017/18, a drop in FDI inflows to 2.8 per cent of GDP, complemented by poor budget execution and supplementary budget allocations, meant that it was forced to return to relatively strong seignorage funding of the Union budget deficit towards the end of the 2018/19 fiscal year (IMF 2020).

In terms of tax revenues, commodity-related taxes and duties accounted for almost half of total domestic current account revenues in 2017/18, including production and sales taxes (40.3 per cent) and customs duties (5.3 per cent) (Table 2). Altogether, indirect taxes accounted for more

than half of fiscal revenues, indicating that effective tax collection from direct tax bases, including formal enterprise profits and personal salary incomes, remains weak in Myanmar. Hence, revenues from direct taxation of incomes and profits accounted for only around one-quarter of domestic current account revenues (25.2 per cent), while property taxes accounted for slightly more than one-tenth (11.3 per cent).

Taking a closer look at the balance between indirect and direct tax collection, the 2016 Special Goods Tax Law clearly helped to increase indirect tax revenues, and, in the process, it seems to have fundamentally changed the balance between direct and indirect tax revenues. Between the 2015/16 and 2016/17 fiscal years, total production and sales tax revenues increased by 28.6 per cent, strongly outpacing the CPI inflation rate of 6.8 per cent during the 2016/17 fiscal year, and the gap between indirect and direct tax revenues further widened in the 2017/18 fiscal year (Table 2). Taking a closer look at the 2016/17 data, the commercial tax collections declined by more than 10 per cent, implying that the 2016 Special Goods Tax reform was instrumental not only in simplifying existing tax procedures but, at the same time, in mobilizing new indirect tax revenues. However, direct tax collection has disappointed over the period 2015–18, with property taxes only just keeping pace with CPI inflation, while the large direct income and profit tax revenues have declined in both nominal and real terms (in real terms, this important revenue source declined by more than 12 per cent).

Continuing limited external financing options, combined with downside risks in terms of foreign savings inflows and reduced future SOE earnings from natural resource extraction (IMF 2020), are, in spite of recent discoveries of hydrocarbon deposits, likely to put further pressure on the Myanmar Union budget over the coming years. In the absence of comprehensive and effective tax reform, the Myanmar government may therefore need to either cut back on Union expenditures or postpone the planned phasing out of central bank financing, which is a clear policy goal of the MSDP (MPF 2018) and was supposed to have occurred during the 2020/21 fiscal year (IMF 2020).

In response to the weak public finances, international institutions have called for reforms in three areas: (1) tax reform, including reform of personal income taxes (short term) and more comprehensive reform of commercial taxes and the special goods tax (medium term); (2) improved budget execution, including reduced resort to central bank financing; and (3) pension reform to ensure long-term fiscal sustainability (IMF 2020). The key message is that comprehensive fiscal reform is a necessity for the Myanmar government in order to move closer to achieving its twin goals of fiscal sustainability and establishing ‘a fair and efficient tax system to increase government revenues’ (MPF 2018).

In this paper, we focus on analysing the implications of tax reform in eliminating future Union budget deficits. Our focus will be on analysing the scope for individual tax instruments to finance future deficits along two low-/high-deficit counterfactual growth paths. Specifically, our focus will be on four overarching types of tax instrument, including two indirect tax instruments, sales taxes and import tariffs,<sup>1</sup> and two direct tax instruments, new payroll taxes (on secondary and tertiary education workers) and enterprise income taxes. The two direct tax instruments were limited to high-education labour (defined in Table 4) and non-agricultural enterprises respectively, in order to better align tax bases with formal worker and formal enterprise tax bases.

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<sup>1</sup> In what follows, the terms ‘sales taxes’ and ‘import tariffs’ will be used to refer to commercial taxes and customs duties respectively.



Table 2: Myanmar Union budget 2015–18 (MKK bn; current prices)

	2015/16		2016/17		2017/18	
	MKK bn	%	MKK bn	%	MKK bn	%
Total domestic receipts—current account	7,824.2	100.0	8,475.3	100.0	8,973.7	100.0
Taxes and duties	6,314.7	80.7	7,122.3	84.0	7,423.5	82.7
Taxes on production and public consumption	2,591.0	33.1	3,331.8	39.3	3,620.2	40.3
Customs duties	467.2	6.0	480.2	5.7	523.8	5.8
Taxes on income and profit	2,326.4	29.7	2,323.7	27.4	2,263.7	25.2
Taxes on the use of state properties	930.1	11.9	986.7	11.6	1,015.8	11.3
SOE earnings	818.9	10.5	590.9	7.0	729.1	8.1
Other domestic receipts	690.6	8.8	762.0	9.0	821.1	9.1
Total domestic receipts	8,077.8	70.0	8,598.2	75.0	9,116.2	73.8
Current account	7,824.2	67.8	8,475.3	74.0	8,973.7	72.7
Capital account	194.9	1.7	55.6	0.5	24.5	0.2
Financial accounts	58.7	0.5	67.3	0.6	118.0	1.0
Total expenditures	11,539.2	100.0	11,459.1	100.0	12,345.1	100.0
Current account	7,381.6	64.0	8,034.6	70.1	8,800.1	71.3
Capital account	3,587.6	31.1	3,180.4	27.8	3,195.5	25.9
Financial accounts (incl. reserve fund)	570.0	4.9	244.1	2.1	349.5	2.8
Surplus before direct external funding (+)	-3,461.3	-30.0	-2,860.9	-25.0	-3,228.8	-26.2
Government foreign loans	571.0	4.9	300.3	2.6	421.4	3.4
Government foreign grants and aid	247.5	2.1	331.9	2.9	199.4	1.6
Surplus after direct external funding (+)	-2,642.9	-22.9	-2,228.7	-19.4	-2,608.1	-21.1
<i>Memorandum items</i>						
	MKK bn	% of GDP	MKK bn	% of GDP	MKK bn	% of GDP
GDP	65,261.9	100.0	72,714.0	100.0	79,760.1	100.0
Total domestic receipts	8,077.8	12.4	8,598.2	11.8	9,116.2	11.4
Current account	7,824.2	12.0	8,475.3	11.7	8,973.7	11.3
Capital account	194.9	0.3	55.6	0.1	24.5	0.0
Financial accounts	58.7	0.1	67.3	0.1	118.0	0.1
Total expenditures	11,539.2	17.7	11,459.1	15.8	12,345.1	15.5
Surplus before direct external funding (+)	-3,461.3	-5.3	-2,860.9	-3.9	-3,228.8	-4.0
Surplus after direct external funding (+)	-2,642.9	-4.0	-2,228.7	-3.1	-2,608.1	-3.3
	% per annum		% per annum		% per annum	
CPI (period average; base year = 2012)*	10.0		6.8		4.0	

Source: authors' construction based on CSO (2019); \* derived from IMF (2019).

### 3 Methods

We utilize a twin set of demographic and macroeconomic models to analyse the implementation of our four types of tax reform instrument in order to analyse the implications of financing strategies to eliminate future Union budget deficits. Specifically, (1) we simulate two counterfactual 2021–40 growth paths (one with low budget deficits and one with high budget deficits), and (2)

for each counterfactual growth path, we simulate four ‘balanced Union budget’ tax reform scenarios, including one for each of our tax policy instruments, covering the period 2021–40.

Our dynamically recursive macroeconomic model for Myanmar is specified around a core static macroeconomic CGE model framework (Löfgren et al. 2002). This so-called multi-sector model framework allows a range of production activities and retail commodities to be captured. It is a standard neoclassical framework in which producers maximize the profits of their production decisions, consumers maximize the utility of their demand decisions, the government collects taxes to fund its spending, savings are collected and channelled into productive investment projects, and domestic retailers engage with foreign traders to trade in import and export goods. In the current context, this model framework, with its detailed accounts of direct and indirect tax instruments, and combined with a wage-clearing labour market specification, is ideal for detailed modelling of our four tax reform instruments, including reforms of existing sales taxes (commercial taxes), import tariffs (customs duties), and corporate income taxes and the introduction of a new payroll tax instrument (acting as a wedge between marginal returns to labour and net wages paid to labour factor owners).

We calibrated our static CGE model based on the recently established 2017 Myanmar SAM (van Seventer et al. 2020). This calibration allowed us to specify our CGE model with 43 activities and 43 commodities; eight production factors including land, natural resource livestock, natural resource fish stock, physical capital stock, and four labour factor types (uneducated and primary-, secondary-, and tertiary-educated); and 20 rural/urban farm/non-farm income-quintile household types (van Seventer et al. 2020). Furthermore, in order to properly capture the distributional implications of our fiscal tax reform analyses, we disaggregated our demographic model to encompass projections for each of the 20 household types and used these projections to produce a full set of household-specific labour factor ownership projections for each of our four labour categories.

Specifically, we calibrated our four labour factor updating equations on the basis of a set of household-specific demographic projections, derived from a standard demographic model specification (Jensen et al. 2019). The 20 household-specific demographic models were calibrated to a set of MOLIP-UNFPA 2014–50 rural-urban population projections for Myanmar (MOLIP 2017) and based on Myanmar-specific demographic parametric assumptions derived from the United Nations’ World Population Prospects 2019 database (UN 2021). Sets of base year activity-specific labour demand and household-specific labour factor ownership matrices were derived from labour force data accompanying the underlying 2017 SAM dataset (van Seventer et al. 2020) and from the 2015 Labour Force Survey (MOLES 2016). Subsequent calibration and counterfactual simulation of our labour factor updating equations, over 2021–40, and complementary projections of labour factor ownership growth paths, were based on the aforementioned household-specific demographic projections, over the same period, corrected for age-specific labour force participation rates published by the Central Statistical Organization (CSO 2018) and complemented with an assumption that the relative shares of the different educational-attainment-focused labour factor categories remain fixed.

We also extracted time series of capital stock growth rates and capital depreciation rates for Myanmar from the Penn World Tables database, version 10.0 (Groningen Growth and Development Centre 2020), in order to calibrate our capital updating equation. Specifically, we initialized our 2017 capital stock from the most recent Penn World Tables 2019 data (Groningen Growth and Development Centre 2021) by applying the 2017 depreciation rate (7.3 per cent) and the 2017–18 capital stock growth rate (10.1 per cent) to scale 2017 investment (MKK29.6 trillion)

from the SAM (van Seventer et al. 2020), whereby we arrived at the 2017 capital stock estimate of MKK172.5 trillion.

Finally, we used historical Myanmar GDP growth rates from the World Bank's World Development Indicators database (World Bank 2021) to run our model forward from 2017 to the base year for our policy simulations, 2021. Specifically, we varied the total factor productivity of our production activities to target the real GDP growth path between 2017 and 2021, and thereby to establish 2021 as the base year for our future policy simulations. Subsequently, we used the same approach to calibrate our two low/high Union budget current account deficit counterfactual 2021–40 growth paths to historical 2011–19 real (6.6 per cent per annum) and nominal (12.2 per cent per annum) GDP growth rates (World Bank 2021), against which our 'balanced budget' tax reform scenarios will be assessed. The high-deficit scenario was derived from a growth scenario where the 2017 Union budget current account (i.e. government consumption) share of absorption (16.8 per cent) was maintained over our 20-year time horizon, while the low-deficit scenario was derived from a growth scenario where the 2017 Union budget current account deficit (i.e. negative government savings) was kept unchanged over our 20-year time horizon (implying that the government budget share of absorption will have declined to 9.2 per cent in 2040).

The structure of our macroeconomic CGE model is illustrated in Tables 3–6, where all data are derived from the underlying 2017 SAM data set (van Seventer et al. 2020). The economic structure of Myanmar, including sector-specific effective sales tax rates (effective aggregate commercial tax and special goods tax rates) and effective import tariff rates (effective customs duty rates), as well as sector-specific export and import shares, is presented in Table 3. The effective sales tax rates indicate that there is little indirect taxation of primary agricultural goods, while higher effective rates of commercial and special goods tax rates apply to secondary commodities (including minerals, processed food and beverages, refined petroleum products, etc.) and select services (including utilities—electricity and water supplies—construction, land transport, hotels, etc.) Effective import duties are virtually non-existent for agricultural and service sectors, while effective duty rates are greater than 1 per cent for most extraction and manufacturing goods sectors (including other mining, food and beverages, textiles, print media, refined petroleum products, mineral products, and other manufacturing products). Import and export shares are either very high or very low: (1) relatively high export shares characterize paddy, vegetables and other crops, fuel minerals and other mining products, textiles, telecommunications, hotels and restaurants, and information services, while (2) relatively high import shares characterize textiles, refined petroleum products, other manufacturing products, postal and courier services, and telecommunications. On average, export shares for primary agricultural and secondary manufacturing sectors (14–15 per cent) are higher than for services (5 per cent), while the average import share of manufacturing (19 per cent) is much higher than for agriculture (less than 1 per cent) and services (4 per cent).

Table 3: Macroeconomic structure of Myanmar, 2017 (per cent)

Commodity	Sales tax rates (TQ)	Import tariff rates (TM)	Export shares (E/X)	Import rates (M/Q)
Paddy	0.0	0.0	28.5	0.1
Vegetables	0.0	0.0	23.7	0.5
Fruits	0.0	0.0	3.9	5.2
Beans	0.0	0.0	0.0	0.0
Other crops	0.0	0.0	38.1	1.7
Livestock	0.0	0.0	0.7	1.0
Forestry and logging	0.0	0.0	4.9	0.1
Fisheries	0.0	0.0	2.4	0.0
Fuel minerals	4.6	0.0	98.3	1.6
Other mining including support services	0.9	4.0	52.1	2.7
Food, beverage and tobacco products	2.9	4.0	3.3	6.8
Wearing apparel and textiles	0.9	1.2	43.2	20.9
Printing and reproduction of recorded media	3.3	4.0	0.0	0.3
Coke and refined petroleum products	0.4	1.2	6.9	35.9
Non-metallic mineral products	1.1	4.0	0.1	11.0
Other manufacturing products	0.1	2.6	11.9	31.1
Electricity, gas, and steam	3.9	0.0	1.0	1.2
Water supply, sewerage	3.8	0.0	0.0	0.1
Construction	3.9	0.0	0.0	0.0
Sale of motor vehicles	0.0	0.0	0.0	0.0
Maintenance and repair of motor vehicles	0.0	0.0	0.0	0.0
Wholesale and retail trade	0.6	0.0	0.0	0.0
Land transport	7.7	0.0	3.8	29.1
Water transport	0.0	0.0	2.4	0.0
Air transport	0.0	0.0	2.4	0.0
Warehousing and support activities for transportation	9.6	0.0	0.4	1.0
Postal and courier	0.0	0.0	0.0	26.5
Telecommunication	1.9	0.0	82.1	42.6
Hotels	46.6	0.0	73.1	0.0
Restaurants	0.0	0.0	24.6	0.0
Publishing, motion pictures, video, TV, and radio	0.0	0.0	0.1	6.5
Computer programming, consultancy, and information service activities	0.0	0.0	59.3	0.0
Banking	0.0	0.0	1.2	6.8
Insurance and other financial auxiliary services	0.0	0.0	1.0	0.0
Real estate	0.0	0.0	0.0	0.0
Owner occupied dwellings	0.0	0.0	0.0	0.0
Professional, scientific, and technical activities	3.5	0.0	0.0	0.0
Other administrative and support services	1.5	0.0	0.0	0.0
Travel agencies	0.6	0.0	68.2	12.1
Public admin. and defence; compulsory social security	0.0	0.0	0.0	0.0
Education	0.0	0.0	0.0	0.0
Health	0.0	0.0	0.0	0.0
Domestic and other services	5.1	0.0	0.9	4.4
Primary sectors	0.0	0.0	14.3	0.8

Manufacturing sectors	1.5	2.5	15.0	18.6
Service sectors	2.1	0.0	4.9	4.4
All sectors	1.6	2.1	10.1	10.9

Note: E = exports, M = imports, X = domestic production, Q = domestic supply.

Source: authors' construction based on van Seventer et al. (2020).

In order to provide an idea about the main income sources of our 20 household types, we present an aggregated version of the household income sources matrix of the 2017 SAM in Table 4 (low-education labour includes workers with maximum primary education attainment, while high-education labour includes workers with minimum secondary education). The table indicates that while rural households receive one-third of their income from each of the low-education labour (32–36 per cent) and high-education labour (32–36 per cent) categories, urban households receive much lower shares of their income from low-education labour (5–17 per cent) and higher shares from high-education labour (40–41 per cent). Another striking difference is that while farm households receive 24–31 per cent of their income from natural resources (non-farm households receive none), non-farm households receive much larger shares from capital (25–53 per cent) than farm households (5–7 per cent).

Table 4: Household income sources (per cent)

Income types		Household types			
		Rural farm	Rural non-farm	Urban farm	Urban non-farm
Factor income	Low-education labour	32	36	17	5
	High-education labour	32	36	41	40
	Capital	5	25	7	53
	Natural resources	24	0	31	0
Government transfers		12	25	15	53
Foreign remittances		7	26	8	53
TOTAL		100	100	100	100

Note: low-education labour factor income = income from 'no education' and 'primary education' labour; high-education labour factor income = income from 'secondary education' and 'tertiary education' labour; capital factor income = distributed income from 'capital' factor and distributed profits from 'enterprises'; natural resources income = income from 'land', 'livestock', and 'fish stocks'; the four household types are derived from our 20 household types by aggregating over quintiles.

Source: authors' construction based on van Seventer et al. (2020).

In order to provide an idea about the sharing of factor income across institutions, we present an aggregated version of the factor income distribution matrix of the 2017 SAM in Table 5. As above, the data indicate that returns to low education are shared mainly among rural households (90 per cent), while returns to high education labour are shared mainly between rural households (57 per cent) and non-farm urban households (40 per cent). These numbers also highlight that 'urban farm households' is a relatively small household category compared with the other three main household categories. Returns to capital are mainly retained by non-farm enterprises (96 per cent) while a minor share accrues to rural farm households (4 per cent). The enterprise retained earnings from non-farm capital are subsequently distributed to rural non-farm households (14 per cent), urban non-farm households (40 per cent), and the government via distributed SOE earnings (27 per cent), while enterprise taxes (4 per cent) and enterprise savings (14 per cent) consume the remaining non-farm capital income. Returns to natural resources overwhelmingly accrue to rural farm households (91 per cent) while a minor share accrues to urban farm households (9 per cent).

Table 5: Factor income distribution (per cent)

	Low-education labour	High-education labour	Capital	Natural resources	Enterprises (non-farm capital)
Enterprises	0	0	96	0	0
Rural farm	47	30	4	91	0
Rural non-farm	43	27	0	0	14
Urban farm	2	3	0	9	0
Urban non-farm	8	40	0	0	40
SoE transfers to government	0	0	0	0	27
Enterprise tax	0	0	0	0	4
Enterprise savings	0	0	0	0	14
TOTAL	100	100	100	100	100

Note: low-education labour factor income = income from 'no education' and 'primary education' labour; high-education labour factor income = income from 'secondary education' and 'tertiary education' labour; capital factor income = distributed income from 'capital' factor and distributed profits from 'enterprises'; natural resources income = income from 'land', 'livestock', and 'fish stocks'; the four household types are derived from our 20 household types by aggregating over quintiles.

Source: authors' construction based on van Seventer et al. (2020).

In order to provide an idea about the relative labour productivity levels of different labour types across different sectors, we provide average labour wages in Table 6, derived from 2017 SAM sector-level factor income flows and accompanying sector-level labour employment matrices (van Seventer et al. 2020). Perhaps surprisingly, no-education workers have higher average wages than primary education workers in investment goods and, in particular, in public administration (but note that the latter average wage is derived from a small number of non-educated public administration employees). Apart from the two aforementioned anomalies, average wages increase monotonically with education levels, reflecting increasing returns to education and skills acquisition in Myanmar.

Table 6: Average labour wages by production sector and labour type, (1,000' MKK per annum)

Production sector	Labour type			
	No-education labour	Primary education labour	Secondary education labour	Tertiary education labour
Primary sector	702	546	463	680
Secondary sector	2,232	2,381	2,747	5,449
Investment goods	3,397	3,190	3,757	6,013
Other manufacturing goods	1,774	2,079	2,323	5,044
Tertiary sector	2,170	2,310	2,917	6,080
Construction	2,537	2,829	3,072	7,811
Public administration	55,715	31,173	34,000	41,671
Other services	1,903	2,027	2,395	3,857
average wages	1,323	1,297	1,791	5,573

Source: authors' construction based on van Seventer et al. (2020) and own calculations.

In terms of CGE model specification, parameterization and macro-closure, household demand is governed by a linear expenditure system (LES), which is calibrated from household-specific consumption shares from our 2017 Myanmar SAM (van Seventer et al. 2020), and based on a Frisch parameter of  $-2.7$ , derived from 2017 Myanmar GDP per capita (GDPcap) of US\$1,292 using the formula  $\text{Frisch} = -36 \times \text{GDPcap}^{-0.36}$  (Lluch et al. 1977); production is specified as a set

of constant elasticity of substitution (CES) functions of aggregate intermediate input demands (disaggregate commodity input demands are determined by Leontief specifications) and aggregate factor input demands (disaggregate factor input demands are also determined by CES specifications) with standard elasticity values for the top-level production specifications (0.8) and the bottom-level factor input demand specifications (0.6); Trade between domestic and foreign agents is specified as a function of relative prices (determined by the real exchange rate), based on Armington CES specifications on the import side and constant elasticity of transformation (CET) specifications on the export side. Standard trade elasticity values were applied on the import side (1.2) and on the export side (1.5).

Our macroeconomic model closure specifies the GDP deflator as price numeraire, i.e. it is kept fixed at the counterfactual growth path. Furthermore, both our counterfactual growth path and our policy scenarios are simulated with a standard neoclassical model closure involving (1) price clearing of all goods and factor markets, (2) real exchange rate clearing of the balance of payments, and (3) savings-driven investment clearing of the capital account. In addition, the two counterfactual growth paths were simulated with (1) a balanced macro-closure ensuring that the government consumption (current account expenditure) share of domestic absorption remained fixed along the counterfactual growth path (high-deficit growth path), and (2) a fixed government savings closure ensuring that the Union budget current account deficit remained fixed along the counterfactual growth path (low-deficit growth path), while our policy scenarios keep government consumption ‘fixed’ at the counterfactual growth path.

In the next section, we simulate the four tax reform-focused ‘budget balance’ Union budget deficit-financing scenarios outlined in Table 7, including budget deficit financing via (1) uniform additive increases in sales tax rates (commercial tax rates), (2) uniform additive increases in import tariff rates (customs duty rates), (3) the introduction of uniform payroll tax rates on secondary and tertiary education workers, and (4) an increase in the (non-farm) enterprise tax rate.

Table 7: Scenario specifications (2022–40)

Counterfactual A	High-deficit growth path: constant government budget share of absorption
Counterfactual B	Low-deficit growth path: government budget deficit growing with inflation
Scenario 1	Elimination of Union current account budget deficit via uniform additive increase in sales tax rates
Scenario 2	Elimination of Union current account budget deficit via uniform additive increase in import tariff rates
Scenario 3	Elimination of Union current account budget deficit via increased uniform payroll tax rates on secondary and tertiary education workers
Scenario 4	Elimination of Union current account budget deficit via increased non-farm enterprise tax rate

Source: authors’ construction based on own specifications.

## 4 Results

The simulation results for our four deficit-financing tax scenarios are presented in Tables 8–11 and Figure 1 below. Macroeconomic GDP component impacts are presented in Tables 8–9, including macroeconomic impacts for our low-deficit case (Table 8) and high-deficit case (Table 9), while distributional household income impacts are presented in Tables 10–11, including distributional impacts for our low-deficit case (Table 10) and high-deficit case (Table 11).

### 4.1 Sales tax financing

The macroeconomic and distributional impacts of our uniform sales tax financing (TSF) scheme are presented in Tables 8–11 and Figure 1. The sales tax simulations suggest that dynamic 0.3 to 0.8 percentage-point and 1.8 to 3.6 percentage-point uniform increases in average sales tax rates will be required to eliminate future government budget deficits along our low-/high-deficit counterfactual growth paths (Tables 8 and 9); the low-deficit simulations require an initial short-term 0.8 percentage-point rate increase (2022) and a smaller long-term 0.3 percentage-point rate increase (2040) (Table 8), while the high-deficit simulations require a larger short-term 1.8 percentage-point rate increase (2022) and an even larger long-term 3.6 percentage-point increase (2040) (Table 9).

Interestingly, our results suggest that sales tax increases, similarly to our other types of tax financing schemes, would be beneficial to the Myanmar economy over both the short and the long term, with initial 2022 real GDP expansions of MKK0.4 trillion (0.4 per cent) in the low-deficit simulations and MKK0.9 trillion (0.8 per cent) in the high-deficit simulations (Figure 1), and total 2022–40 net present value (NPV) GDP expansions ranging from MKK16.4 trillion (1.0 per cent) to MKK75.5 trillion (4.4 per cent) (Tables 8 and 9). These beneficial impacts are mainly due to stimulation of savings and investment in both the short and the long term. Hence, 2022–40 NPV investment expands by MKK20.3 trillion (3.4 per cent)/MKK98.0 trillion (19.0 per cent) in the low-/high-deficit simulations, and this (1) stimulates demand for investment goods and services in the short and long term and (2) leads to capital accumulation with a particularly strong snowballing long-term 8.5 per cent real GDP impact (2040) in the high-deficit case (Figure 1).

Very strong snowballing of investment and capital accumulation means that both GDP growth and GDP growth rate impacts continue to increase throughout our 20-year time horizon in our high-deficit case, albeit with annual growth rate impacts reduced to 0.2 per cent per annum in 2040 (Figure 1). In contrast, GDP growth rate impacts start to decline midway through our 20-year time horizon (after 2031) in our low-deficit case, due to the smaller scope of savings mobilization. The explanation for the slightly unintuitive initial-period tax-induced GDP expansion is that the shift in final demand composition, away from household consumption goods and towards investment goods, raises value added creation due to relatively higher (labour) productivity in the investment goods sector (Table 6).

While demand- and supply-side impacts combine to increase capital accumulation and value added creation, the investment-driven growth impact happens at the expense of reduced household welfare. Hence, increased sales taxes reduce NPV household factor income levels by MKK7.6 trillion (0.5 per cent)/MKK41.0 trillion (2.6 per cent) (Tables 10 and 11) and this drives down NPV household consumption by MKK3.9 trillion (0.4 per cent)/MKK22.5 trillion (2.3 per cent) (Tables 8 and 9) in the low-/high-deficit simulations. Furthermore, while the dynamic macroeconomic impacts for the low-deficit case indicate that the negative private consumption welfare impacts may only be transitional (with welfare impacts turning positive from 2031 onwards), the dynamic welfare impacts in the high-deficit case indicate that households will



continue to experience real consumption welfare losses throughout our 2021–40 time horizon. Hence, the Myanmar government will have to accept significant household welfare reductions, over at least the initial decade of their ‘balanced budget’ policy reform (and longer if financing of larger deficits is required), if they choose to fund their budget deficits via a TSF scheme.

In terms of household income distribution, uniform increases in sales taxes will lead to relatively uniform reductions in NPV income across households, with minor variations between aggregate rural (0.5 per cent/2.6 per cent) and aggregate urban (0.5 per cent/2.7 per cent) household income impacts in the low-/high-deficit simulations (Tables 8 and 9). In relative terms, the four richest 5q income-quintile households are set to lose the least (0.4–0.5 per cent/2.2–2.6 per cent), while the four poorest 1q income-quintile households are set to lose slightly more (0.4–0.7 per cent/2.6–3.3 per cent) (Tables 10 and 11).

## 4.2 Import tariff financing

The macroeconomic and distributional impacts of our uniform import tariff financing (TMF) scheme are presented in Tables 8–11 and Figure 1. In contrast to the relatively low required rate increases in sales taxes, a smaller tax base of imported commodities means that higher rate increases are required for import tariff revenues to eliminate future government deficits (Tables 8 and 9). The dynamics of sales tax increases required to achieve deficit elimination are, however, similar, including (1) in the low-deficit case, a relatively large short-term 10.1 percentage-point tariff increase (2022) and a smaller long-term 4.8 percentage-point tariff increase (2040) (Table 8); and (2) in the high-deficit case, a relatively large short-term 21.5 percentage-point increase (2022) and an even larger long-term 49.0 percentage-point increase (2040) (Table 9).

Similarly to the TSF funding scheme, and to the other funding schemes analysed below, import tariff financing would be beneficial to the Myanmar economy over both the short and the long term, with initial 2022 real GDP expansions ranging from MKK 0.2 trillion (0.2 per cent) to MKK 0.3 trillion (0.2 per cent) (Figure 1), and total 2022–40 NPV GDP expansions ranging from MKK 11.5 trillion (0.7 per cent) to MKK 42.2 trillion (2.5 per cent) (Tables 8 and 9) in the low-/high-deficit simulations. Again, these beneficial impacts can be explained by the elimination of future government budget deficits releasing savings for investment purposes in both the short and the long term. NPV investment expands by MKK 15.4 trillion (2.6 per cent)/MKK 69.9 trillion (13.5 per cent) over the 2021–40 period, and this stimulates both short- and long-term demand for investment goods and services and long-term accumulation of capital. However, due to the high import share of the ‘other manufacturing products’ investment goods sector (Table 3), uniform increases in import tariffs drive up the price of investment goods and thereby dampen real investment expansion and long-term capital accumulation growth. Compared with the TSF scheme, the NPV GDP expansion is therefore reduced from 1.0 per cent/4.4 per cent to 0.7 per cent/2.5 per cent in the TMF scheme.

The dynamic macroeconomic impacts of the TMF scheme are similar to those of the TSF scheme. Hence, the snowballing of investment and capital accumulation leads real GDP growth rate impacts to grow throughout our 20-year time horizon in the high-deficit case (albeit with annual percentage-point growth rate impacts reduced to 0.2 per cent per annum in 2040), while real GDP growth rate impacts start to decline midway through our 20-year time horizon (after 2032) in our low-deficit case, due to the smaller scope of savings mobilization (Figure 1). The unintuitive initial-period tariff-induced GDP expansion is, similarly to the sales tax simulations, caused by the shift in final demand composition, away from household consumption goods and towards investment goods with higher (labour) productivity. However, due to the above-mentioned relatively sharp tariff-induced price increases for imported investment goods, which

acts as both a financing instrument and a measure of protection for domestic production, the savings mobilization generates less real investment and capital accumulation, and thereby reduces the long-term GDP expansion compared with the TSF scheme.

Nonetheless, the TMF scheme mirrors the TSF scheme in the sense that investment-driven growth expansion happens at the expense of reduced household welfare. Hence, increased import tariffs reduce NPV household factor income levels by MKK6.4 trillion (0.4 per cent)/MKK42.0 trillion (2.7 per cent) (Tables 10 and 11), and this drives down 2022–40 NPV household consumption by MKK3.9 trillion (0.4 per cent)/MKK27.7 trillion (2.8 per cent) (Tables 8 and 9) in the low-/high-deficit simulations. Furthermore, the dynamic welfare impacts indicate that households will continue to experience real consumption welfare losses throughout our 2021–40 time horizon for both our low- and our high-deficit simulations. The Myanmar government will therefore, as with to the TSF scheme, have to accept significant household welfare reductions over our 20-year time horizon if they choose to finance their budget deficits via the TMF scheme of increased import tariffs. However, while the NPV household consumption welfare losses are roughly similar, the NPV GDP gains from the TMF scheme are substantially lower than the gains from the TSF scheme, implying that the sales tax financing would most likely be preferred to import tariff financing based on NPV GDP and NPV household consumption considerations.

The above conclusion could, however, be tempered by the fact that our TMF scheme has distinctly different distributional implications. Hence, while sales tax financing, in the high-deficit simulations, leads to welfare reductions of more than 2 per cent for all household types, comparable import tariff financing results in welfare reductions of less than 2 per cent for all farm households, while welfare reductions among non-farm households range from, on average, 2.3 per cent (rural non-farm) to 4.4 per cent (urban non-farm) (Tables 10 and 11). Furthermore, since the wealthiest urban non-farm 5q income-quintile households are losing the most (4.8 per cent), our TMF scheme seems to be more progressive than our TSF scheme, implying that, in spite of being less economically efficient, our TMF scheme may still represent a viable policy option, or form part of a broader policy reform package. Hence, while other potential financing elements such as payroll taxes may have an even more progressive profile (see analysis below), import tariffs have the advantage of being easier to implement as the tax base is easier to control.

### **4.3 Payroll tax financing**

The macroeconomic and distributional impacts of our secondary and tertiary education labour payroll tax financing (TPF) scheme are presented in Tables 8–11 and Figure 1. The payroll tax rates required to eliminate future government deficits lie between 8.6 per cent (2022) and 2.7 per cent (2040) for the low-deficit case, and between 20.1 per cent (2022) and 38.9 per cent (2040) for the high-deficit case (Tables 8 and 9). Similarly to the TMS scheme, a smaller tax base of secondary and tertiary wage payments means that relatively high rate increases are required for payroll taxes to eliminate future government deficits.

Our TPF financing scheme would be beneficial to the Myanmar economy over both the short and long term, with initial 2022 real GDP expansions of MKK0.5 trillion (0.4 per cent) in the low-deficit simulations and MKK1.0 trillion (0.9 per cent) in the high-deficit simulations (Figure 1), and total 2022–2040 NPV GDP expansion ranging from MKK18.2 trillion (1.1 per cent) to MKK83.3 trillion (4.9 per cent) in the low-/high-deficit simulations (Tables 8 and 9). Again, these beneficial impacts are driven by the elimination of future government budget deficits releasing savings for investment purposes. NPV investment in the 2021–40 period expands by MKK22.1 trillion (3.7 per cent)/MKK106.4 trillion (20.6 per cent) in our low-/high-deficit cases, and the strong subsequent capital accumulation means that NPV GDP expansion (1.1 per cent/4.9 per

cent) exceeds that associated with our sales tax scheme (1.0 per cent/4.4 per cent) and import tariff scheme (0.7 per cent/2.5 per cent). The improved efficiency, compared with the previous schemes, follow since our uniform payroll tax scheme, in spite of creating a wedge between marginal returns to labour and net wages paid to labour factor owners, does not distort retail prices in general or investment-related commodity prices in particular (as is the case in both our TSF scheme, and especially, our TMF scheme).

The dynamic macroeconomic impacts of our TPF scheme are similar to those of our commodity-related financing schemes. Again, the real GDP growth rate impacts grow throughout our 20-year time horizon in our high-deficit case (but with annual percentage-point growth rates reduced to 0.1 per cent per annum in 2040), while they start to decline midway through our 20-year time horizon (after 2031) in our low-deficit case (Figure 1). And as before, the unintuitive initial-period tariff-induced GDP expansion is caused by the shift in final demand composition, away from household consumption goods and towards investment goods with higher (labour) productivity. Also as before, the investment-driven growth rates are achieved at the expense of reduced household welfare. Hence, the increased payroll taxes reduce NPV household factor income levels by MKK7.7 trillion (0.5 per cent) /MKK41.3 trillion (2.6 per cent) (Tables 10 and 11), and this drives down NPV household consumption by MKK3.9 trillion (0.4 per cent)/MKK23.1 trillion (2.4 per cent) (Tables 8 and 9) in the low-/high-deficit simulations.

Furthermore, while the dynamic macroeconomic impacts for the low-deficit case, similarly to the TSF scheme, indicate that households' negative private consumption welfare impacts may only be transitional (with welfare impacts turning positive from 2031 onwards; Figure 1), the dynamic welfare impacts of the high-deficit case remain negative throughout our 2021–40 time horizon, implying that the Myanmar government will have to accept significant household welfare reductions, over at least the initial decade of their 'balanced budget' policy reform (and possibly longer depending on the size of underlying financing needs), if they choose to fund their budget deficits via either the TSF or the TPF financing schemes.

While the NPV household consumption welfare reductions of our payroll scheme (0.4 per cent/2.4 per cent) are relatively similar to those of our import tariff scheme (0.4 per cent/2.8 per cent) and sales tax scheme (0.4 per cent/2.3 per cent) (Tables 8 and 9), the distributional profile is different (Tables 10 and 11). For example, for the high-deficit case (Table 11), the four 1q income decile households generally experience better welfare outcomes from our TPF financing scheme as compared with the commodity-related TSF and TMF schemes, including rural farm 1q (TPF: -0.7 per cent; TMF/TSF: -0.4 per cent; -2.5 per cent), rural non-farm 1q (TPF: 0.3 per cent; TMF/TSF: -2.3 per cent/-3.0 per cent), urban farm 1q (TPF: 0.3 per cent; TMF/TSF: -1.2 per cent/-2.7 per cent), and urban non-farm 1q (TPF: -2.2 per cent; TMF/TSF: -4.2 per cent/-3.3 per cent). Hence, while the 1q rural farm households might have seen a slightly smaller erosion of welfare under our TMF scheme, our TPF scheme is generally more beneficial to the poorest households.

While the relatively broad payroll tax base, including not only tertiary but also secondary education labourers, means that the incidence of our payroll tax scheme is not perfectly correlated with the socioeconomic status of individual households, our TPF scheme generally presents a progressive tax financing scheme which (1) shields the poorest rural farm 1q households, and (2) provides economically efficient NPV GDP outcomes compared with our commodity-related funding schemes. If problems of implementation and administration, related to large proportions of informal workers in the labour force, can be overcome, our proposed TPF payroll tax financing scheme may therefore be preferable to policy makers based on considerations of both economic efficiency and distributional outcomes.

#### 4.4 Enterprise tax financing

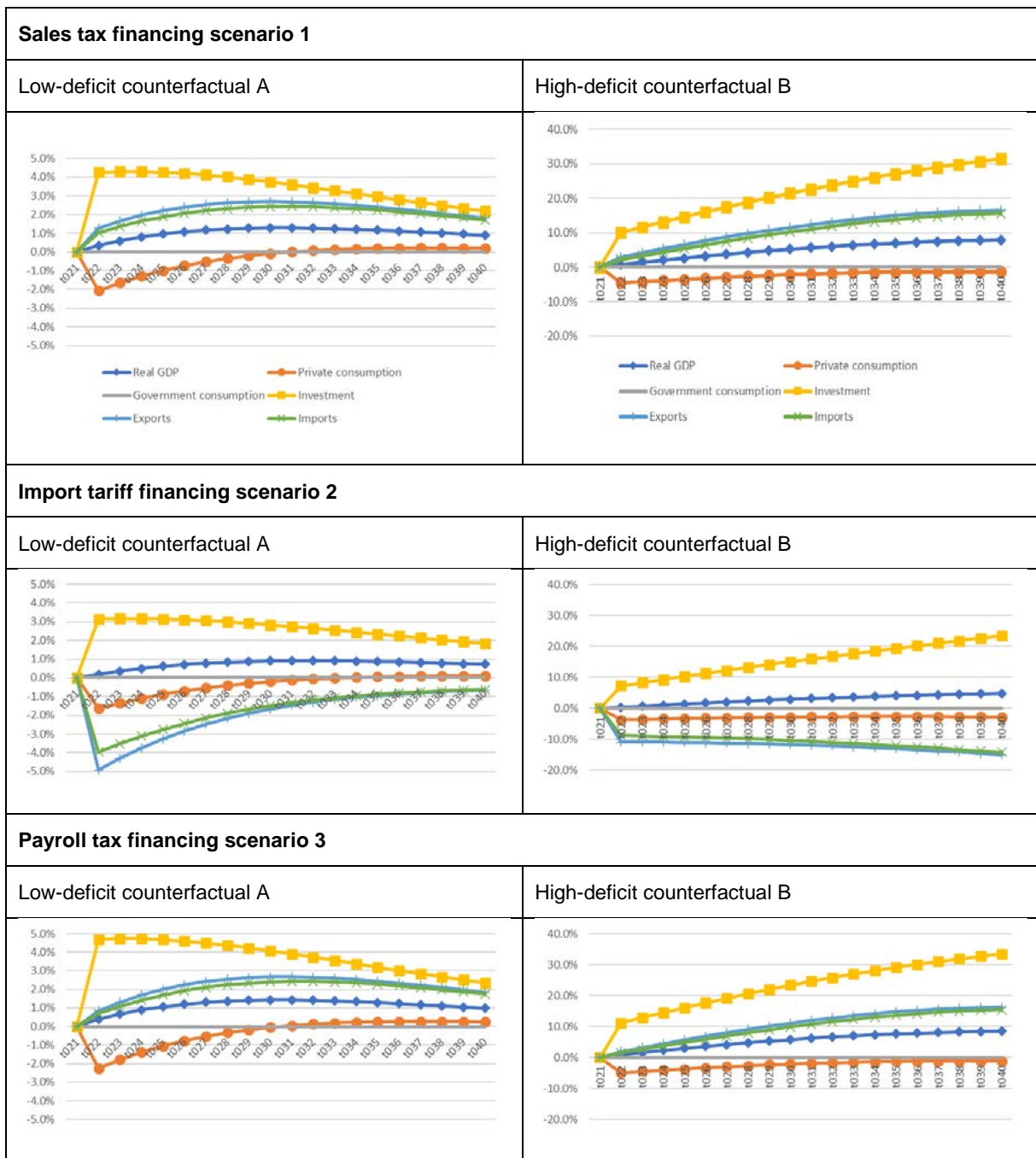
The macroeconomic and distributional impacts of our enterprise tax financing (TEF) scheme are presented in Tables 8–11 and Figure 1. The enterprise tax rates required to eliminate future government deficits lie between 12.6 per cent (2022) and 8.4 per cent (2040) for the low-deficit case, and between 21.1 per cent (2022) and 38.0 per cent (2040) for the high-deficit case (Tables 8 and 9). Due to similarity in the size of tax bases, the enterprise tax rates required to eliminate future government budget deficits are similar to the required payroll tax rates observed above.

Similarly to all former commodity- and payroll-based tax financing schemes, our TEF scheme would be beneficial to the Myanmar economy, with initial 2022 real GDP expansion of MKK0.4 trillion (0.3 per cent) in the low-deficit simulations and MKK0.6 trillion (0.6 per cent) in the high-deficit simulations (Figure 1), and long-term NPV GDP expansion ranging from MKK3.9 trillion (0.8 per cent) to MKK63.8 trillion (3.7 per cent) in the low-/high-deficit cases (Tables 8 and 9). Similarly to our previous tax financing scheme, these beneficial impacts are driven by the elimination of future government budget deficits, releasing savings for investment purposes. NPV investment for the period 2021–40 expands by MKK17.5 trillion (2.9 per cent)/MKK84.0 trillion (16.3 per cent), but the resulting capital accumulation is not sufficient to lift the resulting NPV GDP expansion (0.8 per cent/3.7 per cent) above the expansion recorded for the TSF scheme (1.0 per cent/4.4 per cent) and TPF scheme (1.1 per cent/4.9 per cent). The reduced efficiency compared with these schemes follows since the taxation of enterprise profits creates a wedge between marginal returns to capital and net profits accruing to (non-farm) capital owners—something which, according to our simulations, creates larger inefficiencies compared with the ‘marginal returns to labour’ wedge caused by the payroll tax increases in our TPF scheme.

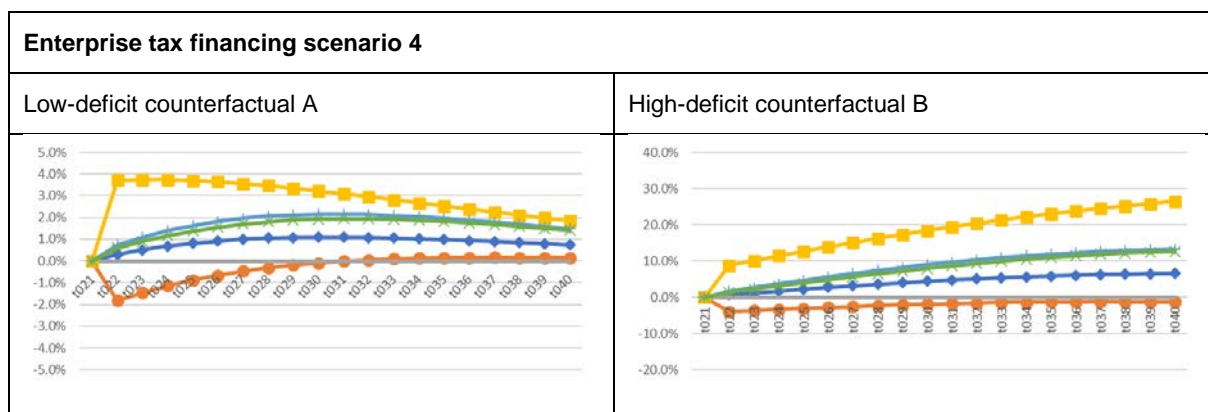
The dynamic macroeconomic impacts of our TEF scheme are similar to those of our commodity-related funding schemes. Again, the ‘high-deficit case’ real GDP growth rate impacts grow throughout our 20-year time horizon (but with annual percentage-point growth rates reduced to 0.1 per cent per annum in 2040), while our ‘low-deficit case’ growth rate impacts start to decline midway through our 20-year time horizon (after 2030) (Figure 1). As before, the unintuitive initial-period tariff-induced GDP expansion is again caused by the shift in final demand composition, away from household consumption goods and towards investment goods with higher (labour) productivity, and the investment-driven growth rates are again achieved at the expense of reduced household welfare. Hence, the increased enterprise taxes reduce NPV household factor income levels by MKK6.7 trillion (0.4 per cent)/MKK35.4 trillion (2.2 per cent) (Tables 10 and 11), and this drives down NPV household consumption by MKK3.5 trillion (0.4 per cent)/MKK20.2 trillion (2.1 per cent) (Tables 8 and 9) in the low-/high-deficit simulations.

Furthermore, while the dynamic welfare impacts for the low-deficit case again, as in the TSF and TPF schemes, indicate that the negative private consumption impacts are transitional (turning positive from 2032 onwards; Figure 1), the real private consumption impacts for the high-deficit case remain negative throughout our 2021–40 time horizon, implying that the Myanmar government will have to accept significant household welfare reductions, over at least the initial decade of their ‘balanced budget’ policy reform, and possibly longer, if they choose to fund their budget deficits via the TSF, TPF, or TEF financing schemes (or combinations thereof).

Figure 1: Dynamic macroeconomic impacts of government deficit reduction scenarios (% deviation from counterfactual)



(continued next page)



Note: no discounting applied.

Source: authors' illustration based on own calculations.

While the NPV household consumption welfare reductions of our enterprise tax scheme (0.4 per cent/2.0 per cent) are relatively similar to those of our TMF (0.4 per cent/2.8 per cent), TSF (0.4 per cent/2.3 per cent), and TPF (0.4 per cent/2.4 per cent) schemes (Tables 8 and 9), the distributional profile is very different (Tables 10 and 11). For example, for the high-deficit case (Table 11), all farm households experience NPV factor income gains in the order of 2.8–3.6 per cent across the board, while rural and urban non-farm households experience NPV income reductions of 1.9–2.9 per cent and 4.1–9.6 per cent, respectively. While the TEF scheme, with its focus on taxation of (non-farm) enterprise profits, benefits farm over non-farm households across the board, the impacts across income quintiles imply that poor 1q income quintile (urban and rural) non-farm households may experience significant welfare losses from the introduction of a TEF scheme. For the 1q income quintile urban non-farm households in particular, the NPV income welfare losses from our TEF scheme would be more than 4 percentage points greater compared with the other financing schemes. Hence, while the TEF scheme presents a policy instrument that may allow for significant redistribution of income from wealthier non-farm to poorer farm households, the fact that it is less efficient, compared with the TSF and TPF schemes, and also has potentially serious distributional challenges, implies that the TEF may not be a preferred 'balanced budget' policy option for Myanmar. However, the fact that a TEF scheme may be more manageable in terms of implementation and administration, at least as far as formal enterprises are concerned, may imply that a TEF scheme could still usefully be included as part of a broader 'balanced budget' policy reform strategy, in which additional measures are taken to compensate poorer households for (transitional) welfare reductions.

Table 8: Macroeconomic impacts of government deficit reduction scenarios, 2021–40—low-deficit case (MKK tr in 2017 prices)

	Base	Sales tax financing scenario 1		Import tariff financing scenario 2		Payroll tax financing scenario 3		Enterprise tax financing scenario 4		
		Δ value	% change	Δ value	% change	Δ value	% change	Δ value	% change	
Real GDP (cumulative)*	1,706	16.4	0.96	11.5	0.68	18.2	1.07	13.9	0.82	
Private consumption	968	-3.9	-0.40	-3.9	-0.40	-3.9	-0.41	-3.5	-0.37	
Government consumption	201	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	
Investment	606	20.3	3.35	15.4	2.55	22.1	3.65	17.5	2.88	
Exports	526	11.3	2.16	-9.8	-1.87	11.0	2.08	8.9	1.68	
Imports	594	11.3	1.91	-9.8	-1.66	11.0	1.85	8.9	1.49	
		Short term (2022) (%)	Long term (2040) (%)	Short term (2022) (%)	Long term (2040) (%)	Short term (2022) (%)	Long term (2040) (%)	Short term (2022) (%)	Long term (2040) (%)	
<i>Tax rates</i>										
TS (all commodities)	1.70%	2.54	2.00	1.70	1.70	1.70	1.70	1.70	1.70	
TM (all commodities)	2.07%	2.07	2.07	10.12	4.84	2.07	2.07	2.07	2.07	
TPF (high-education labour)	0.00%	0.00	0.00	0.00	0.00	8.57	2.69	0.00	0.00	
TE (non-agricultural enterprise profits)	5.68%	5.68	5.68	5.68	5.68	5.68	5.68	12.64	8.35	

Note: \*10% discount rate applied to derive cumulative 2021–40 real GDP components. TS = sales tax rates; TM = import tariff rates; TPF = payroll tax rate on tertiary-educated workers; TE = urban enterprise tax rate.

Source: authors' construction based on own calculations.

Table 9: Macroeconomic impacts of government deficit reduction scenarios, 2021–40—high-deficit case (MKK tr in 2017 prices)

	Base	Sales tax financing scenario 1		Import tariff financing scenario 2		Payroll tax financing scenario 3		Enterprise tax financing scenario 4	
		Δ value	% change	Δ value	% change	Δ value	% change	Δ value	% change
Real GDP (cumulative)*	1,706	75.5	4.42	42.2	2.47	83.3	4.88	63.8	3.74
Private consumption	981	-22.5	-2.30	-27.7	-2.82	-23.1	-2.35	-20.2	-2.06
Government consumption	276	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
Investment	517	98.0	18.97	69.9	13.53	106.4	20.59	84.0	16.26
Exports	494	52.2	10.57	-57.4	-11.62	49.8	10.09	40.5	8.21
Imports	562	52.2	9.29%	-57.4	-10.21%	49.8	8.87%	40.5	7.21%
		Short term (2022) (%)	Long term (2040) (%)	Short term (2022) (%)	Long term (2040) (%)	Short term (2022) (%)	Long term (2040) (%)	Short term (2022) (%)	Long term (2040) (%)
<i>Tax rates</i>									
TS (all commodities)	1.70%	3.53	5.25	1.70	1.70	1.70	1.70	1.70	1.70
TM (all commodities)	2.07%	2.07	2.07	21.47	48.95	2.07	2.07	2.07	2.07
TPF (high-education labour)	0.00%	0.00	0.00	0.00	0.00	20.05	38.88	0.00	0.00
TE (non-agricultural enterprise profits)	5.68%	5.68	5.68	5.68	5.68	5.68	5.68	21.09	37.95

Note: \* 10% discount rate applied to derive cumulative 2021–40 real GDP components. TS = sales tax rates; TM = import tariff rates; TPF = high-education labour payroll tax rates; TE = non-agricultural enterprises tax rate.

Source: authors' construction based on own calculations.



Table 10: Household income impacts of government deficit reduction scenarios, 2021–40—low-deficit case (MKK tr in 2017 prices)

	Base income	Sales tax financing scenario 1		Import tariff financing scenario 2		Payroll tax financing scenario 3		Enterprise tax financing scenario 4	
		Δ income	% change	Δ income	% change	Δ income	% change	Δ income	% change
All households (cumulative)*	1,534.5	-7.59	-0.49%	-6.34	-0.41%	-7.72	-0.50%	-6.73	-0.44%
Rural households (cumulative)*	946.7	-4.46	-0.47%	-1.65	-0.17%	-3.33	-0.35%	2.55	0.27%
Rural farm households (cumulative)*	552.8	-2.41	-0.44%	-0.23	-0.04%	-1.44	-0.26%	4.00	0.72%
Rural farm 1q	37.7	-0.18	-0.49%	0.04	0.11%	-0.05	-0.14%	0.29	0.77%
Rural farm 2q	76.9	-0.37	-0.49%	0.00	0.00%	-0.22	-0.29%	0.55	0.72%
Rural farm 3q	107.0	-0.47	-0.44%	0.05	0.04%	-0.25	-0.24%	0.83	0.77%
Rural farm 4q	146.1	-0.68	-0.47%	-0.16	-0.11%	-0.81	-0.56%	0.99	0.68%
Rural farm 5q	185.0	-0.70	-0.38%	-0.16	-0.09%	-0.10	-0.05%	1.33	0.72%
Rural non-farm households (cumulative)*	393.9	-2.05	-0.52%	-1.42	-0.36%	-1.90	-0.48%	-1.45	-0.37%
Rural non-farm 1q	56.5	-0.35	-0.61%	-0.22	-0.39%	-0.03	-0.06%	-0.33	-0.59%
Rural non-farm 2q	73.6	-0.39	-0.52%	-0.19	-0.26%	-0.09	-0.12%	-0.16	-0.22%
Rural non-farm 3q	74.7	-0.40	-0.53%	-0.26	-0.34%	-0.47	-0.62%	-0.25	-0.34%
Rural non-farm 4q	86.2	-0.43	-0.50%	-0.30	-0.34%	-0.34	-0.39%	-0.31	-0.36%
Rural non-farm 5q	102.9	-0.48	-0.47%	-0.45	-0.44%	-0.97	-0.95%	-0.39	-0.38%
Urban households (cumulative)*	587.9	-3.13	-0.53%	-4.69	-0.80%	-4.39	-0.75%	-9.27	-1.58%
Urban farm households (cumulative)*	49.1	-0.19	-0.38%	-0.04	-0.09%	-0.25	-0.52%	0.35	0.71%
Urban farm 1q	1.8	-0.01	-0.46%	0.00	-0.03%	0.00	0.11%	0.01	0.71%
Urban farm 2q	3.0	-0.01	-0.48%	0.00	-0.11%	0.00	-0.12%	0.02	0.63%
Urban farm 3q	5.2	-0.02	-0.40%	0.00	0.06%	-0.02	-0.31%	0.04	0.76%
Urban farm 4q	10.0	-0.04	-0.40%	-0.01	-0.10%	-0.06	-0.61%	0.07	0.69%
Urban farm 5q	29.0	-0.10	-0.35%	-0.03	-0.11%	-0.17	-0.60%	0.21	0.71%
Urban non-farm households (cumulative)*	538.7	-2.94	-0.55%	-4.65	-0.86%	-4.13	-0.77%	-9.62	-1.79%
Urban non-farm 1q	17.1	-0.12	-0.69%	-0.14	-0.84%	-0.08	-0.44%	-0.30	-1.76%
Urban non-farm 2q	36.5	-0.20	-0.56%	-0.18	-0.49%	-0.34	-0.92%	-0.32	-0.86%

Urban non-farm 3q	60.9	-0.35	-0.57%	-0.38	-0.63%	-0.60	-0.99%	-0.72	-1.18%
Urban non-farm 4q	92.3	-0.54	-0.59%	-0.72	-0.77%	-0.91	-0.98%	-1.35	-1.46%
Urban non-farm 5q	331.9	-1.72	-0.52%	-3.23	-0.97%	-2.21	-0.66%	-6.94	-2.08%

Note: \* 10% discount rate applied to derive cumulative 2021–40 real household impacts.

Source: authors' construction based on own calculations.

Table 11: Household income impacts of government deficit reduction scenarios, 2021–40—high-deficit case (MKK tr in 2017 prices)

	Base income	Sales tax financing scenario 1		Import tariff financing scenario 2		Payroll tax financing scenario 3		Enterprise tax financing scenario 4	
		Δ income	% change	Δ income	% change	Δ income	% change	Δ income	% change
All households (cumulative)*	1,577.4	-41.02	-2.60%	-41.95	-2.66%	-41.29	-2.62%	-35.37	-2.24%
Rural households (cumulative)*	952.0	-24.31	-2.55%	-16.16	-1.70%	-17.41	-1.83%	10.75	1.13%
Rural farm households (cumulative)*	550.9	-13.84	-2.51%	-6.87	-1.25%	-8.06	-1.46%	18.31	3.32%
Rural farm 1q	37.3	-0.98	-2.61%	-0.13	-0.35%	-0.26	-0.70%	1.36	3.62%
Rural farm 2q	76.5	-2.07	-2.70%	-0.75	-0.98%	-1.16	-1.52%	2.53	3.29%
Rural farm 3q	106.5	-2.58	-2.42%	-0.77	-0.72%	-1.34	-1.25%	3.83	3.58%
Rural farm 4q	147.2	-3.93	-2.67%	-2.29	-1.55%	-4.27	-2.90%	4.54	3.07%
Rural farm 5q	183.4	-4.28	-2.33%	-2.94	-1.60%	-1.03	-0.56%	6.06	3.29%
Rural non-farm households (cumulative)*	401.1	-10.47	-2.61%	-9.28	-2.31%	-9.35	-2.33%	-7.56	-1.89%
Rural non-farm 1q	57.2	-1.71	-2.99%	-1.34	-2.34%	-0.16	-0.28%	-1.68	-2.93%
Rural non-farm 2q	74.0	-1.94	-2.62%	-1.37	-1.85%	-0.43	-0.57%	-0.89	-1.21%
Rural non-farm 3q	76.2	-2.03	-2.65%	-1.69	-2.21%	-2.26	-2.96%	-1.32	-1.73%
Rural non-farm 4q	87.2	-2.21	-2.53%	-1.97	-2.25%	-1.64	-1.88%	-1.64	-1.87%
Rural non-farm 5q	106.5	-2.57	-2.40%	-2.90	-2.71%	-4.85	-4.54%	-2.04	-1.90%
Urban households (cumulative)*	625.4	-16.71	-2.67%	-25.79	-4.12%	-23.89	-3.82%	-46.11	-7.37%
Urban farm households (cumulative)*	50.0	-1.17	-2.34%	-0.78	-1.56%	-1.47	-2.94%	1.61	3.21%
Urban farm 1q	1.8	-0.05	-2.73%	-0.02	-1.22%	0.01	0.33%	0.06	3.27%
Urban farm 2q	3.0	-0.09	-2.85%	-0.05	-1.68%	-0.03	-1.11%	0.08	2.77%
Urban farm 3q	5.3	-0.12	-2.31%	-0.04	-0.71%	-0.10	-1.82%	0.19	3.50%
Urban farm 4q	10.2	-0.25	-2.44%	-0.16	-1.61%	-0.34	-3.32%	0.32	3.10%
Urban farm 5q	29.6	-0.66	-2.23%	-0.51	-1.70%	-1.00	-3.38%	0.96	3.22%
Urban non-farm households (cumulative)*	575.4	-15.54	-2.70%	-25.01	-4.35%	-22.42	-3.90%	-47.72	-8.29%
Urban non-farm 1q	17.9	-0.59	-3.27%	-0.75	-4.19%	-0.39	-2.18%	-1.49	-8.30%
Urban non-farm 2q	38.3	-1.05	-2.74%	-1.05	-2.73%	-1.71	-4.45%	-1.56	-4.07%

Urban non-farm 3q	63.7	-1.79	-2.80%	-2.14	-3.35%	-3.01	-4.71%	-3.54	-5.55%
Urban non-farm 4q	98.0	-2.81	-2.85%	-3.88	-3.93%	-4.68	-4.75%	-6.65	-6.75%
Urban non-farm 5q	357.5	-9.30	-2.57%	-17.20	-4.76%	-12.63	-3.49%	-34.48	-9.55%

Note: \* 10% discount rate applied to derive cumulative 2021–40 real household impacts.

Source: authors' construction based on own calculations.

## 5 Conclusion and discussion

Myanmar public finances are characterized by relative weakness in several key areas, including revenue collection, budget execution, and long-term sustainability. In spite of extensive reform efforts throughout the past decade, there is therefore a need for comprehensive public finance reform. In terms of Union budget financing, the lack of sustainable revenue sources has resulted in the government repeatedly resorting to central bank financing over recent years, and induced inflationary pressures have acted as an inflation tax and, most likely, reduced the efficiency of financial intermediation. In this paper, we focus on the scope for fiscal tax reform to finance future Myanmar Union budget deficits and, at the same time, to lower the need for future central bank financing and related inefficient inflation taxation. Specifically, we analyse how four tax instruments, including the expansion of existing commercial taxes, customs duties, and corporate taxes and the introduction of new payroll taxes for more highly educated workers, could contribute to financing future 2022–40 government budget deficits in the context of two separate low and high budget deficit growth paths.

Regardless of the choice of policy instrument and deficit growth path, we find that (1) eliminating government budget deficits would mobilize savings for investment purposes and lead to NPV GDP gains (where gains increase with the size of counterfactual budget deficits), and (2) real household consumption welfare losses would be substantial and only transitory for some tax instruments and only when financing of limited deficits is required. Hence, only under the best of circumstances would annual welfare losses be transitional (turning into annual household consumption welfare gains around 2031), while in more pessimistic circumstances our ‘balanced budget’ policy reform would lower household consumption welfare throughout our 20-year time horizon.

Our analyses of efficiency and household welfare impacts, covering low-/high-deficit cases, suggest that in terms of NPV GDP gains, the most efficient of our four financing schemes, each focused on one tax instrument, is likely to be payroll taxes (1.1 per cent/4.9 per cent). This is followed by sales taxes (1.0 per cent/4.4 per cent), enterprise taxes (0.8 per cent/3.7 per cent), and import tariffs (0.7 per cent/2.5 per cent). Hence, in the high-deficit case the choice of financing instrument may change NPV GDP impacts by a factor of 2, implying that the design of a comprehensive tax reform strategy could have significant implications for economic outcomes over the coming decades, with differences amounting to as much as 2.4 per cent of NPV GDP over our 20-year time horizon. We also find that welfare losses, measured by NPV household consumption, would be stable and independent of the choice of tax instrument, amounting to MKK3.5–3.9 trillion (0.4 per cent)/ MKK20.2–27.7 trillion (2.1–2.8 per cent) in the low-/high-deficit cases, but, as mentioned above, the Myanmar government would have to accept significant household welfare losses, over at least the initial decade, and possibly longer, if they decided to implement a ‘balanced budget’ tax reform using one of our four proposed tax instruments (or combinations thereof).

Furthermore, while inter-household distributional impacts were limited for sales tax reform, and not well targeted at low-income households for enterprise tax reform, the corporate tax instrument did allow for potentially strong income redistribution from non-farm to farm households. More importantly, the payroll tax instrument, with its nicely progressive profile of NPV income incidence due to being levied solely on secondary and tertiary education workers, was found to be not only the most efficient instrument, but also an instrument which, perhaps combined with others within in a broader reform strategy, could be used to ensure that especially low-income households were protected from larger welfare losses. In this context, it is also worth noting that

import tariffs, although the least efficient among our potential tax financing instruments, were found to have a nice progressive distributional profile as well.

There are, however, also several caveats to our findings. While the payroll and corporate tax instruments were found to have good efficiency impacts and potentially useful distributional implications, possibly in combination with each other, the required effective rates at which these tax instruments need to be applied in order to individually finance future budget deficits in our high-deficit case (38.9 per cent and 38.0 per cent in the long term) is a matter of concern. If the two tax instruments were to be combined, in an effort to maintain the current 2017 Union budget share of absorption over the long term, effective payroll and enterprise tax rates would, most likely, have to be raised to around 20 per cent each over the long term. Recalling that the effective 2017 enterprise tax rate was only 5.7 per cent to begin with, this suggests that even in combination with payroll tax reform, a massive expansion of the existing formal corporate tax rate of 25 per cent and/or of the corporate tax base would be required to achieve the long-term 'balanced budget' reform goal.

Furthermore, the implementation, administration, and enforcement of effective tax rates above 20 per cent, by Myanmar's Internal Revenue Service, would also not be an easy task given Myanmar's status as a lower-middle-income country with a relatively weak tax base, where 76 per cent of the workforce (according to 2015 figures) is employed in the informal sector, and where the establishment of formal small and medium-sized enterprises has been hampered, since 2011, by continuing weaknesses in the enforcement of contracts, protection of minority investors, and ability to obtain credit, and by limited application of labour laws (DTDA 2019). Overall, 83 per cent of all Myanmarese businesses (in 2016) remain informal, and they consist mostly of family-owned businesses and self-employed workers (DTDA 2019). The combination of weak enterprise and labour payroll tax bases implies that, while payroll and enterprise tax instruments may have nice efficient impacts and progressive distributional profiles (in terms of incidence across household income quintiles), they are unlikely to provide a sufficiently large tax base to finance future government funding needs.

In terms of the payroll tax instrument, a further caveat to our proposed tax reform elements is that while our categorization of labour in terms of educational attainment is useful for analysing labour market and education policy issues, it is not particularly useful for the implementation of payroll taxes, which are typically specified in a progressive manner based on individual workers' assessed income levels and the (formal or informal) nature of their workplace. Hence, Myanmarese legislators will probably want to graduate tax rates according to payroll levels in line with the existing personal income tax schedule, in which rates are progressively increased from 0 per cent (for earnings of less than MKK2 million) to 25 per cent (for earnings of over MKK30 million). While graduation of taxation based on the educational attainment among workers may therefore be an efficient tax instrument with nice distributional properties, it may not be feasible to implement administratively exactly as proposed here. This is all the more the case since secondary education workers include all workers who have graduated from middle school, implying that around half of the 'secondary and tertiary education' workers have educational attainment levels below that of high school. Hence, while workers with a high-school degree or higher educational degrees are more likely to be employed in the formal sector, workers with only a middle-school degree are more likely to be employed in informal family businesses, implying that the administrative identification and assessment of payroll taxes for secondary and tertiary education workers is likely to be complicated and to further add to the problems of a weak tax base.

In summary, our results demonstrate the importance of Myanmar pursuing future tax reform and Union budget balance, not only to avoid disruptive resorting to central bank financing and inefficient inflation taxation, but also to release savings for future capital accumulation and

economic growth. However, two of the three most efficient tax instruments identified in this paper, including secondary and tertiary education payroll taxes and enterprise taxes, are likely to suffer from weak tax bases, implying that while they could potentially contribute to broader tax reform with both efficient and progressive tax collection, the commodity-focused tax instruments, consisting of sales taxes and import tariffs, are likely to continue to form the core of any comprehensive tax reform designed to finance future government deficits. While import tariffs were demonstrated to be the least efficient financing source among our four tax instruments, the fact that this instrument increases economic growth and has a progressive distributional household welfare impact profile suggests that it could be a useful element of comprehensive tax reform. Another key advantage of employing the import tariff instrument as a financing instrument is that it is relatively easy to administer, monitor, and enforce, due to existing border controls and ongoing monitoring of trade flows. Nonetheless, a limited import tariff tax base suggests that the core of any future comprehensive tax reform, in order to achieve the twin goals of a sustainable and efficient tax system, will need to be focused on reforming commercial tax collection.

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