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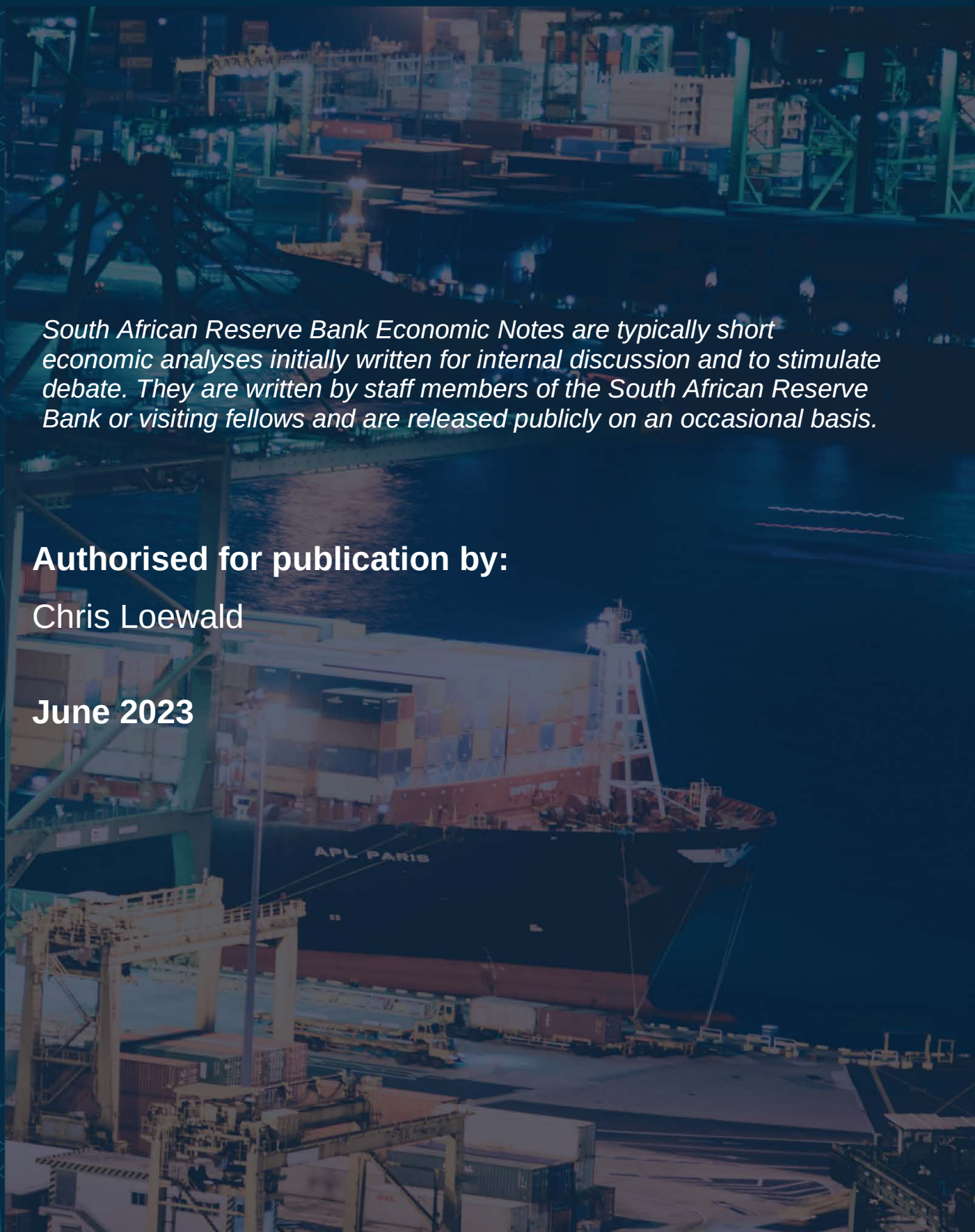
SOUTH AFRICAN RESERVE BANK



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Authorised for publication by:

Chris Loewald

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South Africa's revenue performance during COVID and beyond: The impact of commodity prices

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Abstract

Revenue rebounded strongly in the 2021/22 fiscal year following a sharp decline in 2020/21. This recovery was supported by a strong rally in global commodity prices. We assess the performance of the primary tax revenue streams over the 2020/21 and 2021/22 fiscal period and model the impact of the raised commodity prices. We estimate that 30% of the increase in gross revenue during the 2-year period is attributable to the growth in commodity prices. Using our model estimates together with official SARB projections for GDP and commodity prices we projected a revenue surplus of R92 billion compared to National Treasury's Budget Review 2022 estimate of R1,588 billion for 2022/23. The budget deficit falls to 4.3% compared to National Treasury's estimate of 6.0%, however, significant expenditure risks remain.

1. Introduction

National government revenue rebounded strongly in the 2021/22 fiscal year after a sharp decline in the preceding fiscal year. Total tax revenue recorded a surplus relative to National Treasury's (NT's) Budget Review (BR) 2021 projections of close to R200 billion for 2021/22. Performance was driven by economic recovery from the Covid-19 lockdown fallout, and a strong rally in global commodity prices. This year, both growth and commodity prices are expected to moderate. In this note, we assess the impact of commodity prices on the primary tax revenue streams during the 2020/21 and 2021/22 fiscal years and provide new revenue estimates for the 2022/23 fiscal period.

2. Revenue outperformance in 2021/22

Table 1 provides a summary of the 2020/21 and 2021/22 revenue outcomes.[1] Revenue for the 2021/22 period performed better than estimates in the NT's February BR 2021 with actual gross revenue exceeding BR 2021 estimates by almost R200 billion (14.6%).

[1] There are three primary tax streams: Personal Income Tax (PIT), Company Income Tax (CIT) and Value Added Tax (VAT). A further two revenue streams particularly impacted by the pandemic form part of the analysis: Customs duty (Imp. dut.) and Specific Excise duties (Exc. Tax). The former was impacted by the trade movement restrictions during the lockdowns, while the latter was directly impacted by the regulations to prohibit/limit the sale of alcohol and cigarettes during the lockdowns.

Table 1: SA tax revenue outcomes (R'bn)

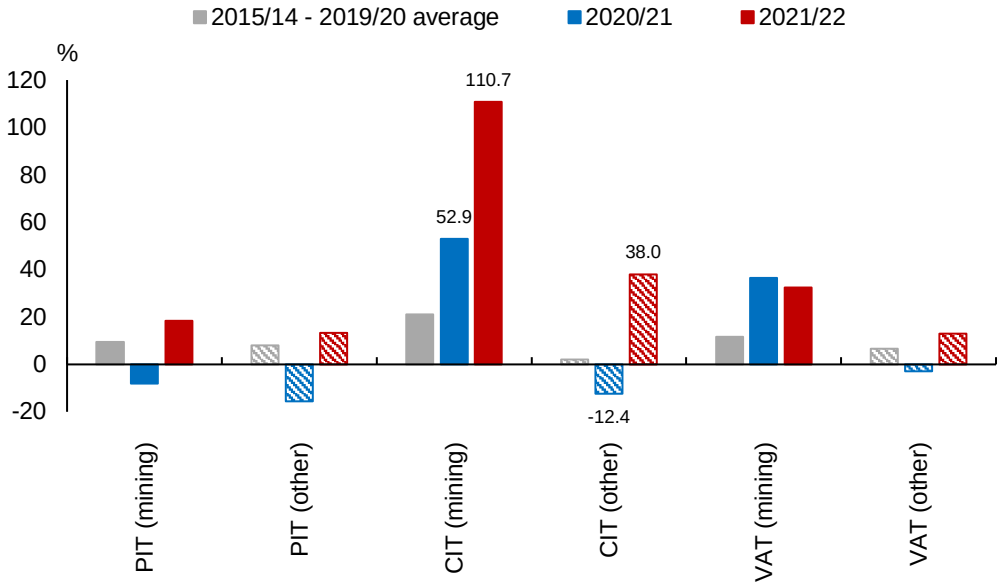
Revenue stream	BR 2020 2020/21 est.	2020/21 actual	BR 2021 2021/22 est.	2021/22 actual	Surplus against BR 2021	Surplus (%)
	(i)	(ii)	(iii)	(iv)	(v)=iv-iii	(vi)=v/iii
PIT	546.8	487.0	516.0	554.0	38.0	7.4
CIT	230.2	202.1	213.1	320.4	107.3	50.4
VAT	360.6	331.2	370.1	390.9	20.7	5.6
Exc. tax	48.8	32.2	43.7	49.7	6.0	13.7
Imp. dut.	59.5	47.3	53.1	58.9	4.9	9.1
Other	179.5	149.9	169.1	190.8	21.8	12.2
Gross Revenue	**1,425.4**	**1,249.7**	**1,365.1**	**1,563.8**	**198.6**	**14.6**

Source: NT (2020; 2021)

Revenue from taxes on income, profits, and capital gains in the 2021/22 fiscal year was 20% greater than the BR 2021 estimates, mostly driven by strong provisional CIT tax payments. Corporate Income Tax (CIT) recorded the largest surplus of 52% which contributed more than half of the full gross revenue surplus. Figures 1 to 3 illustrate that revenue outperformance was driven largely by the mining sector. The mining sector directly contributes nearly 7% to GDP, but its indirect contribution is larger. Almost 60% of South Africa's exports are of raw mining material or mining-related products, and mining shares represent one-third of the overall JSE index (Makrelov & Spearman, 2021).

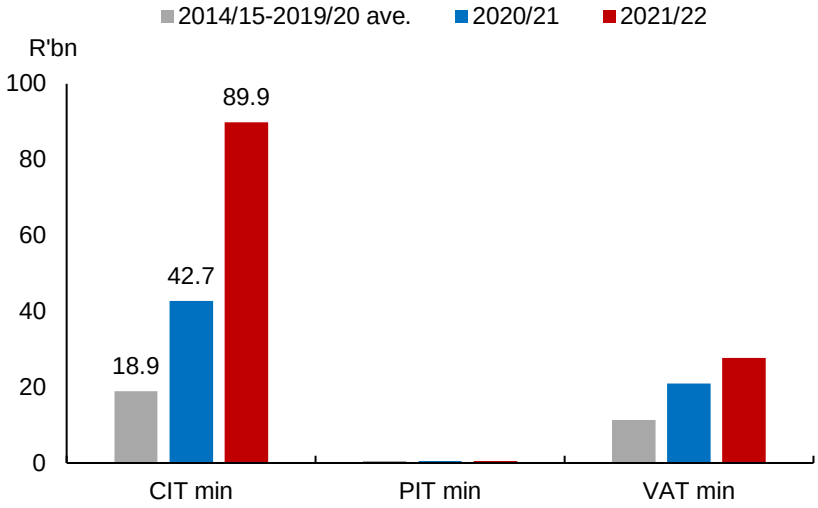
Growth in mining sector revenue contributions outperformed other sectors on aggregate across the main revenue streams. For example, CIT contributions from mining increased by 53% and 111% during the 2020/21 and 2021/22 periods respectively (Figure 1). By comparison, CIT in other sectors on aggregate grew by -12% and 38% respectively. CIT from the mining sector contributed approximately R90 billion in 2021/22 – more than double the 2020/21 contribution, and more than fourfold the average contribution of the pre-COVID period (Figure 2).

Figure 1: Contribution to revenue stream by sector (% change y-o-y)



Sources: SARS and SARB

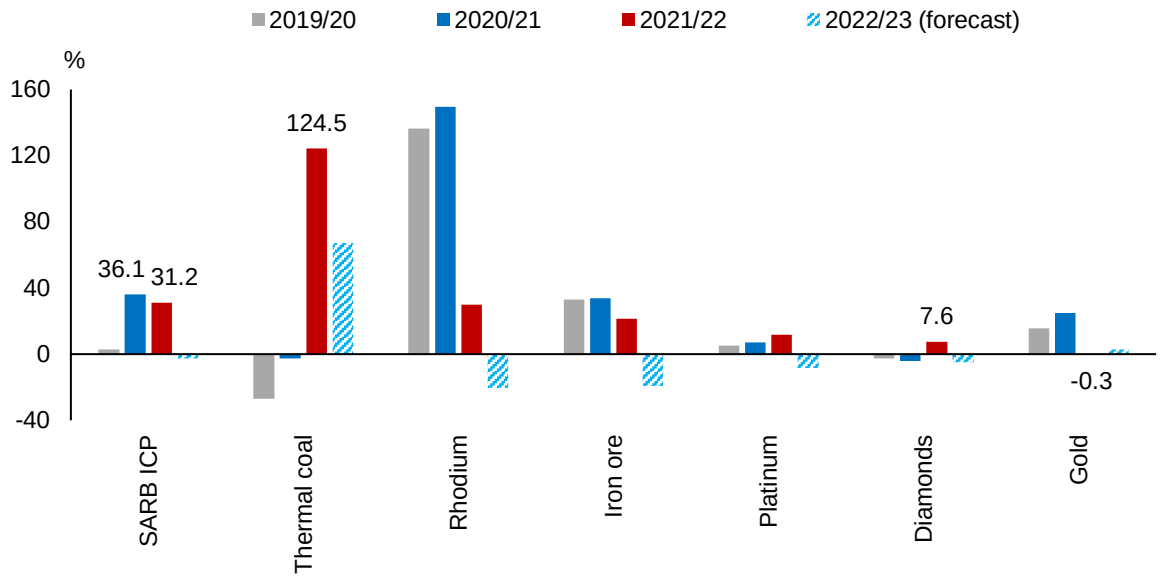
Figure 2: Mining sector contribution to revenue by stream (R'bn)



Sources: SARS and SARB

Mining sector performance has been driven by elevated commodity prices (Loewald & Makrelov, 2021). This also boosted GDP growth from the improving terms of trade (Janse van Rensburg & Visser, 2021). Figure 3 illustrates growth in the SARB index of commodity prices (ICP) and selected underlying commodity components. The SARB ICP increased by 36% in the 2020/21 fiscal year followed by a further 31% in the 2021/22 fiscal year. In the 2021/22 period, the prices of South Africa's biggest exports increased significantly: diamond prices increased by 7.6% and coal prices increased by 124%. Commodity prices are still largely higher than pre-COVID, but growth rates declined in the second half of 2021.

Figure 3: Changes in commodity prices (% change y-o-y average)[2]



Source: SARB

3. Assessing impact and forecasting gross revenue

We use generalised least squares (GLS) regression analysis to measure tax buoyancy and to estimate the impact of commodity prices on tax revenue. Tax buoyancy is a measure of the responsiveness of tax revenue to changes in revenue base and is defined as:[3]

$$\text{Tax buoyancy} = \%\Delta\text{Revenue stream} \div \%\Delta\text{Revenue base}.$$

The regression model takes the following form:

$$\%\Delta\text{Revenue stream}_t = \beta_0 + \beta_1 \%\Delta\text{Revenue base}_t + \beta_2 \%\Delta\text{ICP}_{t+x} + \varepsilon_t$$

where β_0 is a constant term, β_1 is the buoyancy ratio,[4] β_2 is the regression estimate of the commodity price impact, ε is a white noise error term, and time-script factor x has a value of 0, -1, or -2 depending on the lag of the ICP factor used in each respective revenue stream regression.[5] Table 2 illustrates the revenue bases used for the revenue stream regressions.

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2 Plotted fiscal year percentage change is calculated as the y-o-y difference in the average monthly ICP value for the fiscal year to avoid end-of-year month changes from skewing the overall impact.

3 Revenue base is the key macroeconomic determinant of each revenue stream.

4 A buoyancy value above one means that revenues are growing faster than the revenue base; below one means revenues are growing below the rate of revenue base growth.

5 Correlation coefficients indicate highly significant levels of correlation among all revenue streams and their respective bases (see appendix Table A1). All revenue streams except excise taxes show highly significant correlation with commodity prices, however, correlation coefficient values and levels of significance vary across different lagged values of the ICP. Due to high levels of autocorrelation amongst lagged ICP values, only the ICP factor with the highest correlation coefficient and level of significance is used in each regression.

Table 2: Tax revenue streams and corresponding tax base

Revenue stream	Revenue base
Gross tax revenue	GDP
PIT	Wages,
CIT	Gross operating surplus
VAT	Household consumption
Excise tax	Household consumption
Import duties	Imports

We use the model coefficients to estimate the impact of economic activity and commodity prices on revenue streams for the 2020/21Q1 to 2021/22Q4 period,[6] and to forecast nominal gross revenue for the 2022/23 fiscal year.[7] To forecast nominal gross tax revenue we use the regression model estimates of real gross revenue tax buoyancy and commodity price effects, the SARB's Core Model forecasts for GDP and inflation, and the SARB's ICP forecast. The SARB's July 2022 Core Model vintage projects growth in nominal GDP of 6.4%, inflation of 6.6%, and a 15.2% decline in the ICP for the 2022/23 fiscal year. By comparison, GDP growth is more than double NT's February BR 2022 nominal GDP growth projection of 3.0%. A key factor in NT's forecasted slowdown is an anticipated reversal of both elevated inflationary pressures and the commodity prices rally; however, after the February budget global economic developments changed course. For example, war in Ukraine spurred a further rise in general commodity prices and global inflation has remained elevated. Table 3 shows NT's February projected commodity price growth rates compared to April forecasts by the SARB and Consensus Economics (2022). Similarly, the BER's April terms of trade projections for 2022 improved to -6.3% from -9.4% in November 2021, and nominal GDP projections increased from 4.2% to 5.4% (BER, 2021; 2022).

Table 3: 2022 calendar year commodity price growth projections (y-o-y change %)

Commodity	NT	SARB	Consensus Econ.
Gold	1.6	4.93	5.1
Platinum	-5.0	1.61	-0.6
Coal	16.3	95.88	103.1
Iron ore	-24.3	24.89	-17.9
Palladium	-18.0	29.62	0.3

Sources: SARB; NT (2022); Consensus Economics (2022)

6 We use real quarterly values of revenue data and non-seasonally adjusted macroeconomic data from fiscal year 2000/01Q1 to 2019/20Q4 to estimate regression coefficients. Nominal data is adjusted for inflation to provide real values. The regression period covers 19 years with 76 observations. This period includes the mid-2000's commodity cycle and the global recession and recovery of the 2008/9 financial crisis. The time series are non-linear and upwards trending; augmented dickey-fuller (ADF) tests confirm all series have unit roots. We take the year-on-year first difference of the natural logarithm of the data. The transformed data series are therefore linearised year-on-year growth rates for each quarter from 2001/02Q1 that are adjusted for seasonality. Despite this transformation, Durbin Watson and Breusch Godfrey LM test statistics on OLS regression results indicate autocorrelation in OLS residuals. The Prais–Winsten and Cochrane–Orcutt GLS estimators are therefore used to limit the impact of autocorrelation.

7 For discussions on using tax buoyancy as a measure of tax revenue performance see Purohit (2005), Morris, et al, (2009), and IMF Fiscal Affairs Department (2011).

4. Model estimates

Coefficient estimates and their respective p-values are provided in Table 4. All tax base regressors are highly significant at the 1% level. Commodity prices are significant at the 5% level for gross revenue and PIT, and highly significant at the 1% level for CIT.

Table 4: GLS regression model estimates

Revenue stream	Revenue base factor			ICP factor			Model R^2
	β_1	Coeff.	Std. err.	β_2	Coeff.	Std. err.	
Gross rev.	GDP	1.403	0.274	ICP_{t-1}	0.084	0.039	0.450
	p-val.	0.000		p-val.	0.035		
PIT	Wages.	0.752	0.261	ICP_{t-1}	0.067	0.029	0.203
	p-val.	0.005		p-val.	0.025		
CIT	GOS	1.133	0.401	ICP_{t-2}	0.260	0.076	0.273
	p-val.	0.006		p-val.	0.001		
VAT	Cons.	1.771	0.328	ICP_t	0.072	0.070	0.424
	p-val.	0.000		p-val.	0.310		
Imp. duties	Imports	0.710	0.150	ICP_t	0.018	0.092	0.273
	p-val.	0.000		p-val.	0.849		
Exc. tax	Cons.	0.747	0.268	ICP_{t-1}	0.027	0.033	0.160
	p-val.	0.007		p-val.	0.411		

The real gross revenue buoyancy estimate of 1.4 indicates that a 1% increase in real GDP generates a 1.4% increase in real gross revenue.[8] This estimate is in-line with real estimates calculated for South Africa by the IMF,[9] and IMF estimates across OECD countries (Belinga, et al., 2014; Dudine & Jalles, 2017). The ICP coefficient indicates that a lagged percentage change in the ICP results in a 0.08% increase in real gross revenue. Figure A1 illustrates the regression estimates of revenue performance.[10]

4.1. Revenue decomposition

We use the results from our regression model to decompose the impact of revenue bases and commodity prices on revenue performance over the 2020/21 and 2021/22 period. Table 5 shows the model estimates of the change in revenue attributable to revenue base impacts and commodity price effects over the two-year period.

8 Regressions are replicated using nominal data for comparison. These results are presented in Table A2. Haughton (1998) advises against using nominal measures of buoyancy as these are biased towards unit value. This is due to the impact of inflation on numerator and denominator values with higher inflation creating greater bias – see Haughton (1998, p. 1). Real measures of buoyancy omit this bias. Our nominal gross revenue buoyancy regression estimate is 0.98.

9 Using data from 1990 to 2014, Dudine & Jalles (2017) estimate a real gross revenue buoyancy regression coefficient for South Africa of 1.61.

10 Applying the model results to the 2020/21 – 2021/22 period indicates that the model underestimates but otherwise accurately captures the revenue dynamics during this period (grey highlighted area). The model severely underestimates the performance of excise taxes highlighting the unprecedented impact of the ban on cigarette and alcohol sales during the COVID lockdown period (Figure A1.f).

Table 5: Revenue change decomposition (R'bn)

Revenue stream	Actual revenue (nominal)[α]			Model estimates (converted to nominal)[β]					
	2019/20	2021/22	Change (2022/21 – 2019/20)	Change (2022/21 – 2019/20)	Revenue base impact	Comm. price impact	Base-year inflation impact[γ]	Change (%)	Comm. impact (%)
	(i)	(ii)	(iii)=ii-i	(iv)	(v)	(vi)	(vii)	(viii)=iv/iii	(ix)=vi/iv
Gross rev.	1,343.6	1,568.0	224.4	228.1	57.8	67.7	102.7	101.6	29.7
PIT	527.6	554.5	26.9	51.4	-10.7	21.5	40.6	191.4	41.8
CIT	211.5	288.2	109.8	76.7	16.6	33.9	16.6	69.9	44.1
VAT	346.7	366.1	43.6	19.4	-19.8	13.9	25.3	44.4	71.9
Imp. duties	55.5	60.4	2.7	4.9	0.3	0.5	4.1	183.0	10.8
Exc. tax	52.3	56.4	1.8	4.1	-0.8	0.8	4.0	228.2	20.9

Notes:

[α] Revenue numbers differ from Table 1 due to revisions by SARS after publication of the BR.

[β] Model estimates treat 2019/20 as the base year and are adjusted by inflation to convert to nominal values.

[γ] Base-year inflation impact is calculated as 2019/20 revenue multiplied by the inflation rate for 2020/21 and 2021/22.

Source: SARS and model estimates

The model estimates 102% of the actual change in gross revenue for the period and attributes 30% of the estimated change to commodity price effects.[11] The model estimates 70% of the increase in CIT and attributes 44% to commodity price effects.

4.2. Revenue forecast

Using our regression coefficient estimates and the SARB's July 2022 Core Model projections for GDP, inflation, and commodity price growth, we forecast revenue for the 2022/23 period. Table 6 shows the forecasted impact of the model estimates on NT's main budget framework.

Table 6: Main budget framework estimates (R' bn)

	BR 2021 2021/22 est.	BR 2022 2021/22 revised est.	BR 2022 2022/23 est.	Model 2022/23 est.
Main budget revenue	1,351.7	1,549.1	1,588.0	1,680.4
Main budget expenditure	1,834.3	1,896.0	1,975.3	1,975.3
Main budget balance	**-482.6**	**-346.9**	**-387.3**	**-294.9**
Nominal GDP	5,352.2	6,251.5	6,441.3	6,824.4
Balance / GDP (%)	-9.02	-5.55	-6.01	-4.32

Source: SARS and model estimates

11 The gross revenue estimate for the full 2-year period obscures the fact that the model both underestimates the fall in revenue in 2020/21 and underestimates the rise in revenue in 2021/22. These counteractive effects improve the estimate for the full 2-year period; see appendix tables A3 and A4 for the yearly estimates.

Revenue increases to R1,680 billion, compared to NT's estimate of R1,588 billion (a surplus of R92 billion).[12] SARS' surplus revenue collection from April 2022 to June 2022 already exceeds R46 billion on the back of a R41 billion CIT surplus suggesting our forecast is aligned with current revenue trends. CIT is once again driven primarily by mining.

Our revenue figure translates into a simple year-on-year nominal tax buoyancy ratio of 1.01 compared to NT's estimate of 1.09.[13] Based on NT's main budget expenditure estimates, the budget deficit falls to 4.3% compared to NT's estimate of 6.0%; however, there are significant expenditure risks to this budget improvement. These include higher wage adjustments in the government sectors, support for SOEs, and extensions of the current COVID-19 grant support.

5. Concluding remarks

In this note we assess the performance of the primary tax revenue streams during the COVID period. We show that CIT improved disproportionately better than the other tax categories during that period. CIT benefitted most from mining sector revenue generated by a substantial and sustained commodity price rally. We estimate that over 30% of the gross revenue increase and 44% of the CIT increase during the COVID period is attributable to the growth in commodity prices.

Using the SARB's Core Model projections for GDP, inflation, and commodity price growth, we project revenue outcomes for 2022/23 and assess the corresponding budget deficit impact. Main budget revenue is projected to rise to R1,680 billion and the budget deficit to fall to 4.3% suggesting an improved budget position compared to NT forecasts.

Despite the improved fiscal outlook, risks remain and include the poor financial condition of several major state-owned companies, higher borrowing costs, and additional spending pressures. These risks will have negative consequences for achieving fiscal targets set by government.

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12 To align with NT's "gross tax revenue after proposals" figure as presented, our 2022/23 revenue estimate includes the adjustments totaling R10.4 billion as outlined in BR 2022.

13 Buoyancy is calculated as: $1.01 = \frac{1{,}690.8 - 1{,}547.1}{1{,}547.1} \div \frac{6{,}824.4 - 6{,}251.5}{6{,}251.5}$; $1.09 = \frac{1{,}598.4 - 1{,}547.1}{1{,}547.1} \div \frac{6{,}441.3 - 6{,}251.5}{6{,}251.5}$. The numerator figures are obtained by reversing the adjustments made in BR 2021 and BR 2022 to arrive at the "gross tax revenue after proposals" figures presented in Table 6. Figure A2 illustrates quarterly nominal tax buoyancy ratios for the regression data; the average for the period is 1.08. Our 2022/23 nominal buoyancy forecast is in line with this average and with year-on-year buoyancy measures published in BR 2020 (2016/17=0.97, 2017/18=1.00, 2018/19=1.23) and BR 2022 (2019/20=1.07, 2020/21=3.69, 2021/22=1.93, 2022/23=1.09).

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Appendix

Table A1: Revenue stream correlation coefficients

Revenue stream	Base factor	ICP factors			
		ICP_t	ICP_{t-1}	ICP_{t-2}	ICP_{t-3}
Gross rev.	0.728	0.383	0.455	0.389	0.231
p-val.	0.000	0.001	0.000	0.001	0.050
PIT	0.599	0.337	0.440	0.381	0.281
p-val.	0.000	0.003	0.000	0.001	0.016
CIT	0.483	0.179	0.309	0.357	0.291
p-val.	0.000	0.121	0.007	0.002	0.013
VAT	0.604	0.425	0.292	0.081	-0.160
p-val.	0.000	0.000	0.011	0.493	0.175
Imp. duties	0.647	0.432	0.402	0.283	0.120
p-val.	0.000	0.000	0.000	0.015	0.312
Exc. tax	0.308	0.222	0.226	0.084	0.069
p-val.	0.007	0.055	0.051	0.478	0.564

Table A2: GLS regression estimates using nominal data

Revenue stream	Revenue base factor			ICP factor			Model R^2
	β_1	Coeff.	Std. err.	β_2	Coeff.	Std. err.	
Gross rev.	GDP	0.982	0.376	ICP_{t-1}	0.102	0.043	0.286
	p-val.	0.011		p-val.	0.022		
PIT	Remun.	0.596	0.266	ICP_{t-1}	0.069	0.015	0.157
	p-val.	0.028		p-val.	0.028		
CIT	NOS	1.079	0.410	ICP_{t-2}	0.259	0.075	0.263
	p-val.	0.010		p-val.	0.001		
VAT	Cons.	1.319	0.369	ICP_t	0.117	0.083	0.269
	p-val.	0.001		p-val.	0.164		
Imp. duties	Imports	0.666	0.151	ICP_t	0.027	0.089	0.251
	p-val.	0.000		p-val.	0.764		
Exc. tax	Cons.	0.219	0.313	ICP_{t-1}	0.052	0.034	0.058
	p-val.	0.486		p-val.	0.130		

Table A3: 2020/21 revenue decomposition (R'bn)

Revenue stream	Actual revenue (nominal)			Model estimates (nominal)			
	2019/20	2020/21	Difference	Difference	Rev. base impact	Comm. price impact	Inflation impact
Gross revenue	1,343.6	1,236.1	-107.42	-31.3	-102.4	26.8	44.4
PIT	527.6	487.0	-40.62	-1.8	-27.6	8.4	17.4
CIT	211.5	214.8	-9.40	3.3	-11.0	7.2	7.0
VAT	346.7	308.9	-15.56	-37.8	-52.9	3.6	11.4
Imp. duties	55.5	51.1	-8.13	-4.4	-6.6	0.3	1.8
Exc. tax	52.3	50.8	-14.47	-1.5	-3.5	0.2	1.7

Table A4: 2021/22 revenue decomposition (R'bn)

Revenue stream	Actual revenue (nominal)			Model estimates (nominal)			
	2020/21	2021/22	Difference	Difference	Rev. base impact	Comm. price impact	Inflation impact
Gross revenue	1,236.1	1,568.0	331.87	250.4	151.1	40.9	58.5
PIT	487.0	554.5	67.50	53.3	16.9	13.2	23.2
CIT	214.8	288.2	119.17	73.4	37.2	26.7	9.5
VAT	308.9	366.1	59.16	57.2	33.0	10.3	13.9
Imp. duties	51.1	60.4	10.84	9.4	6.9	0.2	2.3
Exc. tax	50.8	56.4	16.25	5.6	2.7	0.6	2.3

Figure A1: Model vs actual real revenue (% change)

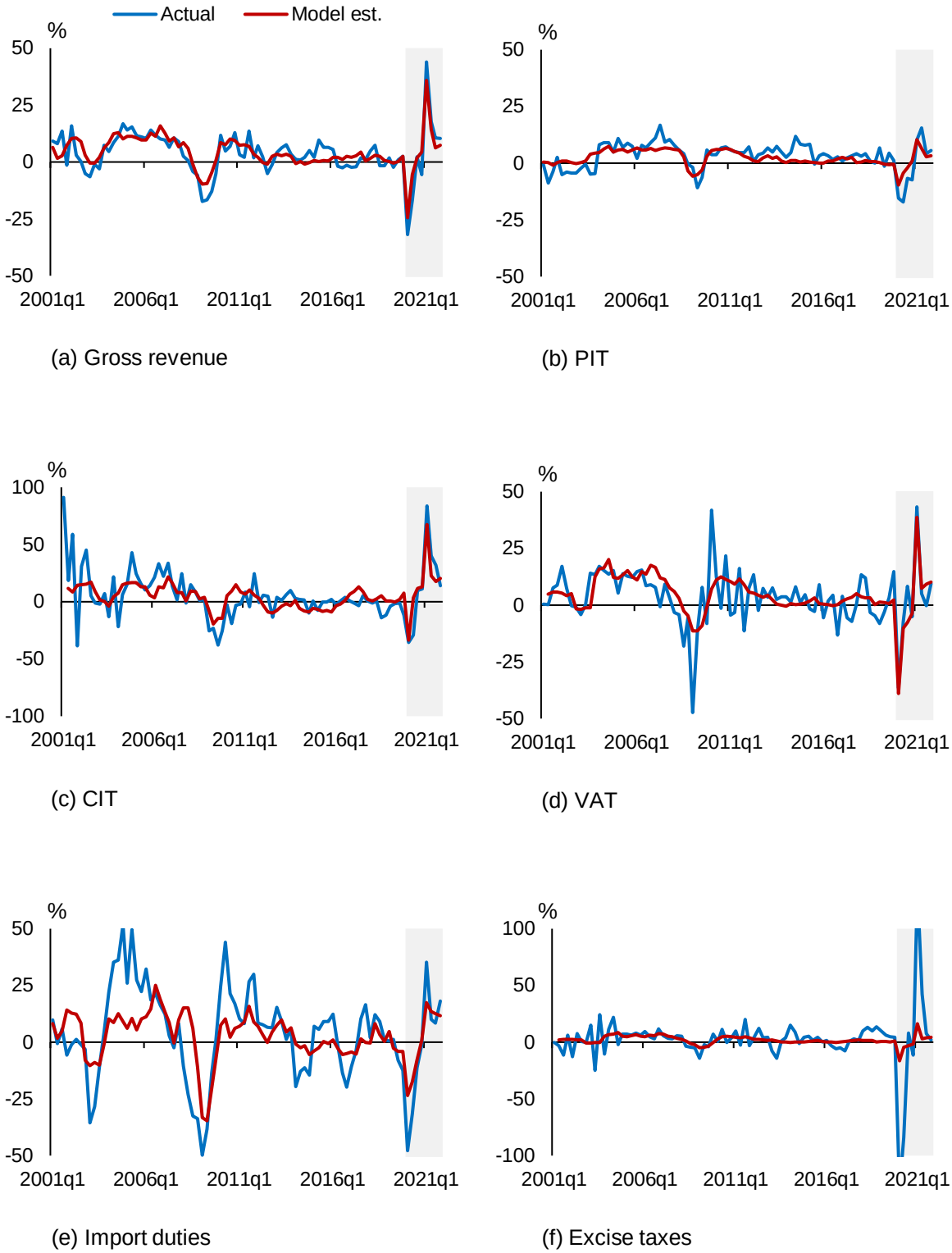

Figure A2: Quarterly nominal gross revenue buoyancy ratios