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Ports regulation in South Africa: An equitable tax rate approach

Authors:
Mahesh Fakir[1]
Mihalis G. Chasomeris[2]

Affiliations:
[1]Retired: ex-CEO of the Ports Regulator of South Africa, Durban, South Africa

[2]Graduate School of Business and Leadership, College of Law and Management Studies, University of KwaZulu-Natal, Durban, South Africa

Corresponding author:
Mihalis Chasomeris,
chasomerism1@ukzn.ac.za

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Orientation: The Ports Regulator of South Africa (PRSA) allows South Africa's National Ports Authority (NPA) to use a rate of return pricing methodology called the Required Revenue (RR) model to annually apply for tariff increases.

Research Purpose: This article compares the pass-through of corporate tax rate approach to the use of an equitable tax rate in the RR model from 2011 to 2017.

Motivation for the study: From 2011 to 2017, the PRSA allowed the use of the pass-through of corporate tax rate (28%) approach in the RR model. However, from 2018 it applied an equitable tax rate approach. It can be argued that the equitable tax rate approach should have been used from 2011.

Research design, approach and method: The calculation of the equitable tax rate uses Transnet's annual segmental financial statements. The results are compared with the revenue results from the pass-through of the corporate tax rate approach.

Main findings: Applying the equitable tax rate (15.73%) as opposed to a pass-through tax rate (28%), the NPA revenue would have been R2.6 billion (US$187m) lower, a substantial saving for port users.

Practical/managerial implications: Continuing to apply this equitable tax rate approach could result in future annual savings of about R500m (US$36m) for port users if the NPA remains a division. However, if the NPA is incorporated as a subsidiary, then the original pass-through of corporate tax rate approach should resume.

Contribution/value-add: Reports on the development of the equitable tax rate approach and its contribution to economic regulatory methodology.

Keywords: port pricing; rate of return regulation; Ports Regulator of South Africa; National Ports Authority; Transnet.

Introduction

There is economic regulation of ports in several countries, including South Africa, Australia, India, Greece, Peru, Philippines, Portugal, Canada, the Netherlands and Brazil (Angelopoulos et al. 2019). The regulation of port prices (tariffs) typically uses either a price cap methodology or a rate of return methodology (Gumede & Chasomeris 2017). In South Africa, a version of the rate of return methodology forms the basis of what the Ports Regulator of South Africa (PRSA) refers to as the required revenue (RR) model (Ports Regulator of South Africa 2017a). An RR model calculation is used to determine the total quantum of revenue that the National Port Authority (NPA) may collect in any 1 year from port users after approved adjustments to port tariffs by the Ports Regulator. The RR model incorporates port user payments for infrastructure and operating expenses and enables the Ports Authority (as the regulated entity) to make a risk-adjusted return on port assets (as determined by a weighted average cost of capital [WACC] formula) (Gumede & Chasomeris 2018).

Several of the values of the variables used in the calculation of the RR model have been critiqued by port users and other port stakeholders. For example, evidence shows a substantial overvaluation of the NPA regulatory asset base and an unrealistically high asset beta that assumed the NPA to be a higher-risk entity than it actually is under regulation. Such issues have resulted in higher prices to port users and higher revenues and profits to the NPA (Chasomeris 2015; Meyiwa & Chasomeris 2020). This article continues the constructive critique of the RR model and focuses on the treatment of tax in the RR model (a form of rate of return regulation). This article compares the pass-through of corporate tax approach to the use of the equitable tax rate in the RR model. It refines the rate of return methodology, and indeed the RR model, by considering the case where a regulated entity is not a 'standalone' entity, but a 'division' within a 'group' consisting of many

'divisions' not individually liable for the payment of taxes. An equitable tax rate takes the losses of the loss-making divisions that are part of the group into account, and further, the principle of proportionality is applied between the profitable divisions in apportioning and sharing the tax burden to the size of their profits.

South Africa's *National Ports Act* of 2005 (hereafter the Act) envisages a commercial ports system whose state ownership of port infrastructure is vested in the National Ports Authority (NPA) as a state monopoly, and it further creates the PRSA as an independent economic regulator to ensure fairness in pricing (RSA 2005) and to prevent monopolistic abuse. The Act sets out that the NPA shall be incorporated as a subsidiary wholly owned by the Transnet group (SOC), upon the Act coming into effect. Up to the period under analysis, almost a decade and a half since the passing of the Act, the NPA has remained a division of Transnet rather than the 'subsidiary' envisaged, for reasons beyond the scope of this article. In the application of its RR tariff methodology, the Ports Regulator had previously treated the NPA as a subsidiary in the calculation of allowed revenue for tax, as incorporation could have happened at any time. In 2017, the Regulator for its 2018–2019 tariff determination modified its tax calculation to reflect a reduced tax allowance in treating the NPA as a division.

This article contributes in several ways. Firstly, in attempting to contribute to the work of other economic regulators regulating unincorporated divisions of a corporate group, it examines theoretical differences in the tax treatment of regulated subsidiaries or standalone regulated entities, as opposed to regulated divisions within a corporate group. It then derives formulae for the new equitable tax rate approach used by the Ports Regulator to assist in correcting such 'disproportionalities' arising out of the corporate form of regulated entities. Secondly, it reports on the development of a model for a new 'equitable tax rate' method, which considers the profits and losses of other divisions with a group, for the determination of a fair tax rate for a regulated division within a group. Thirdly, it uses NPA financial statements for the period 2011–2017 to provide an empirical application and analyses of the equitable tax rate approach in the calculation of the RR model. The relevant formulae and a practical system of implementing the 'equitable tax rate' approach ensure that the profits and losses of other divisions within a group are taken into account in determining regulatory tax allowances for a regulated division within an unregulated group using a rate of return tariff methodology. Finally, it explores and confirms the Ports Regulator of South Africa's (2017a) approach to taxation of the NPA and further extrapolates this to the calculation of the tariff determinations in previous years in order to estimate future port user savings through reduced port tariffs, as well as the potential loss to port users over the 7 years of regulation (2011– 2017), before the new equitable tax rate approach was conceived of, and applied.

Literature review

South Africa's system of nine state-owned commercial ports is rare internationally, and the economic price regulation of this system is largely unprecedented. There is one NPA (as opposed to regional or municipal ports authorities). Planning of investment in port infrastructure and marine services is done nationally. Hence, there may be cross-subsidisation between ports and port users and a sharing of resources between the nine ports. The NPA also controls the licensing of terminal operators, and this has been an issue with some stakeholders that believe there are competition issues and a conflict of interest as the NPA, under Transnet, issues licenses to both private sector terminals and their sister division called Transnet Port Terminals (TPT) (Meyiwa & Chasomeris 2020). Consequently, the NPA makes a single annual tariff submission to the Ports Regulator, using the RR model to calculate the RR for the entire NPA. This is in contrast to the regulation of ports in other countries like India and Australia. In India, the Tariff Authority for Major Ports (TAMP) regulates the 12 major ports and a separate tariff application submission is made for each port. Thus, the income and expenditure of each port is known by the TAMP. A lack of published audited financial information by ports has hindered public participation in the regulation of South Africa's ports. A complex structure with the NPA as a regulated division of an unregulated group, together with consolidated accounting techniques, results in unnecessary complexity and inadequate access to information that could improve port regulation. Indeed, a study by Meyiwa and Chasomeris (2020) used content analyses to examine 137 port stakeholders' submissions from 2009/2010 to 2018/2019. They concluded that the governance structure of the NPA was shown to promote anticompetitive behaviour and they recommend a swift incorporation of the NPA as a stand-alone entity outside of Transnet.

Acciaro (2013) reviewed port pricing literature from 1974 to 2013 and found that most studies make use of anecdotal evidence and that:

> [*F*]rom a methodological point of view, there are very few empirical studies and … most papers that deal with port pricing as a core issue make use of conceptual economic models and game theory. (p. 211)

The regulation of port prices (tariffs) typically uses either a price cap methodology or a rate of return methodology (Gumede & Chasomeris 2017).

South Africa's *National Ports Act* of 2005 (RSA 2005) sets out a commercial ports system of nine ports whose infrastructure is owned by the state through a NPA as a state-owned monopoly (a part of the Transnet state-owned logistics group), and therefore it creates the Ports Regulator, whose functions in terms of section 30(1) of the Act are to:

- Exercise economic regulation of the ports system in line with government's strategic objectives.
- Promote equity of access to ports and to facilities and services provided in ports.
- Monitor the activities of the Authority to ensure that it performs its functions in accordance with this act. (p. S30)

The Ports Regulator, in its economic regulation function, has adopted the RR approach that transparently builds up cost

and other components. The Regulator (Ports Regulator of South Africa 2017a:5, 6) explains that the RR approach is used to determine fair port pricing for all port stakeholders. It allows cost recovery as well as a reasonable profit (return on assets) to the regulated entity, and therefore allows for all the regulated entity's operating costs, depreciation and notably for the purposes of this article, the profit tax that the entity requires to pay on allowed profit. The method protects port users from 'paying excessive monopolistic prices, with the argument being that monopolistic firms should be required to charge the price that would prevail in a competitive market'.

This RR approach, in addition, fulfils the requirements of the *National Ports Act* directives, which require that the Regulator ensures that approved tariff levels allow the Ports Authority to (Ports Regulator of South Africa 2017a):

- Recover its investment in owning, controlling and administering ports and its investment in port services and facilities:
- Recover its costs in maintaining, operating, controlling and administering ports and its costs in providing port services and facilities; and
- Make a profit commensurate with the risk involved in ports services and facilities. (p. 5)

Indeed, there appears to be consensus in the literature on the importance of cost recovery for port infrastructure (Haralambidies 2002; Santos, Mendes & Guedes Soares 2016). In the case of the NPA, in addition to full cost recovery, a return on port assets related to risk is allowed, and it is calculated using the RR approach. The formula for the RR, as per the Port Tariff Methodology of the Ports Regulator for Tariff Years 2018–19 to 2020–21 (Ports Regulator of South Africa 2017a:7), is as follows:

$$\text{'RR} = (v - d + w)\, r + D + E + T \pm C \pm \text{ETIMC} \pm \text{WEGO'} \quad \text{[Eqn 1]}$$

'*Where:* RR = Revenue Required; v = value of the assets used in the regulated services; d = accumulated depreciation on such assets; w = Working Capital; r = Regulated Return on Capital; D = depreciation accounted for in the period of the tariff; E = operating costs (OPEX); T = taxation expense; C = claw-back; ETIMC = Excessive Tariff Increase Margin Credit; WEGO = Weighted Efficiency Gains from Operations; and (v – d + w) = Regulated Asset Base'.

This formula is an international standard building block model. Tariffs for the year ahead, and two following years of the multiyear methodology validity period, are based on forecasts of the variables of the RR formula listed above. As each year passes, the forecasted assumptions are replaced with actual data, and when all the actual data is available for a tariff year, the formula is used to redetermine the tariff, and a corrective adjustment is made in the following year via the claw-back mechanism (C) (Ports Regulator of South Africa 2017a). Quantities pertaining to the various variables are either clawed back or given back from or to the regulated entity's RR, to address any differences between estimates and actuals. Claw-back calculations are performed each year within a multiyear tariff determination system. As actual data for the first tariff year will only be available in the second year, the applicable claw-back will only be completely implemented in the third year, often on a 50–50 basis. As an example, cargo volumes for any year's tariff calculation can only be an estimate until the year has passed, whereupon the actual measured volumes will be used for the calculation of claw-backs. Similarly, any component or variable of the RR formula may thus be estimated as accurately as possible in a particular year and subsequently rectified using the claw-back mechanism in the subsequent 2 years when the actual data is known.

The items in the formula dealing with 'Excessive Tariff Increase Margin Credit (ETIMC)' as well as with 'Weighted Efficiency Gains from Operations (WEGO)' (Ports Regulator of South Africa 2017a:7) are notable modifications by the Ports Regulator to the standard building blocks of the RR approach, and while ETIMC has been used previously by the Ports Regulator as an innovative 'savings' mechanism in the regulatory practice in previous years to reduce potential higher than inflation tariff spikes, the WEGO is a new innovation that incentivises performance improvements in the operation of the ports system by the use of either additional or reduced profits (Ports Regulator of South Africa 2017a).

To correct for differences in estimates, versus what actually materialises in the year in which the tariffs are applied, the RR approach also contains the ETIMC. As explained in the published methodology:

> [*T*]he ETIMC mechanism allows for large increases in required revenue and/or tariffs that may arise from volume volatility or substantial capital expenditure programmes in future years to be partly offset by moderately higher tariff increases in the short-term. (Ports Regulator of South Africa 2017a:7)

Thus, amounts that could be clawed-back, reducing tariffs in the following year, could also rather be retained in the ETIMC facility to be used in reducing tariffs in years in which higher prices are anticipated, thus resulting in a smoother price path and greater certainty in pricing.

Several concerns about the RR model have been raised, including that it may 'incentivise unnecessary port capital expenditure (investments)', 'bloat operating expenditure' and set port authority prices at higher 'levels that are not in the best interests of the country's trade competitiveness and economic development objectives' (Chasomeris 2015; Gumede & Chasomeris 2017). In addition, port stakeholders (mainly port users) have complained that the application of the RR model has allowed the NPA to generate excessive profits that are not adequately reinvested into the port infrastructure and marine services but are rather used to subsidise other, less profitable divisions in the Transnet Group (Meyiwa & Chasomeris 2020).

Treatment of taxation within the revenue required approach

In terms of South Africa's *Income Tax Act* of 1962 (RSA 1962) (as amended), a '(Pty) Ltd', as a subsidiary of a holding company pays tax directly to the revenue authorities at the corporate tax rate (presently 28%), while the tax liability of a group consisting of divisions is by the group alone. From the inception of the Ports Regulator's interim methodology in the 2014–2015 financial year (Ports Regulator of South Africa 2013a) and also in the first multiyear methodology for 2015–2016 to 2017–2018 (Ports Regulator of South Africa 2014a), taxation has been a pass-through allowance set at the corporate tax rate of 28%. In Equation 2 below:

> [*N*]et revenue before tax allowance is the revenue after all costs, including interest and depreciation, have been accounted for, ie. it is the pretax return to equity before being grossed up to make allowances for taxation. (Ports Regulator of South Africa 2013a: 15)

$$\text{Tax allowed} = (\text{Net revenue before tax allowance})/(1-t) \times t \qquad \text{[Eqn 2]}$$

(where t = the corporate tax rate)

The reasons for the 28% pass-through tax rate approach may include simplicity, ease of calculation and certainty to the sustainability of the NPA. In addition, according to the National Ports Act 12 of 2005, the NPA was expected to be incorporated as a wholly owned subsidiary of the Transnet Group, rather than remain a division, and it was therefore correct for the Regulator to contemplate that this could have happened at any time. Thus, in terms of the Act, it was not inappropriate for the Regulator to assume the incorporation of the NPA into National Ports Authority (Pty) Ltd with Transnet as the sole member and shareholder, as before actual incorporation or registration, the Act deems it to be the Authority and expects it to function as the Authority.

The Ports Regulator's methodology uses a 'vanilla weighted average cost of capital (WACC)' to calculate a return on equity, which comprises a 'post-tax cost of equity' and a 'pre-tax cost of debt' (Ports Regulator of South Africa 2013a). However, the idea that this is a pragmatic solution of a 'notional' tax allowance as an approximation to the actual tax payable by the Ports Authority, in practice comes nowhere close to satisfactory, as the incorporation of the Authority (from a division into a subsidiary) had not materialised more than a decade after the Act had been promulgated, and the warning issued by the NPA (TNPA 2012) stated:

> [*T*]he Authority is not a legal entity for which tax is calculated and paid. Furthermore, any attempt to estimate a pro rata share of actual tax paid by Transnet may be quite unrepresentative of the tax burden that would have be borne by the Authority had it been a separate corporation. (pp. 25–26)

This warning seemed to be without merit. Indeed, this article will show (see Table 5) that over the 7 years of regulation (2011–2017), tax allowances provided for by the Ports Regulator within its RR tariff methodology have been disproportionately large in relation to the actual tax liability of the Transnet Group in most years. In 4 of the 7 years, the NPA tax allowance was over half (50%) of the actual tax liability of the Transnet Group, and much more than the group tax in FY2016, at 216.30%. A solution that did try to estimate a *pro rata* share of the actual tax liability of the Transnet group therefore had to be found.

In its second Multi-Year Tariff Methodology for 2018/2019 to 2020/2021 (Ports Regulator of South Africa 2017a), the Ports Regulator states that it will accept the current corporate tax rate of 28% (*t*) adjusted in relation to the taxation of the Transnet Group as a whole, as the NPA is a division within the group. It envisaged a proportional tax rate, with assumption that the NPA is an operating division that does not independently pay tax, as opposed to a subsidiary of Transnet Group that would have been liable for its own tax submission. This annually approximated proportional tax rate will be readjusted through the claw-back mechanism from information it would obtain from annually published audited Transnet Group Financial Statements. This represented a departure from previous methodologies in intent and the actual mechanism of how it could work. Indeed, the Ports Regulator of South Africa (2017b) concludes that:

> [*T*]he continued revenue allowance of 28% of profit for NPA taxes can only be fair for a stand-alone entity paying its taxes directly to the South African Revenue Service (SARS) and that if the NPA remains one of the profit-making divisions of Transnet, among other such divisions, an equitable tax rate for the fair sharing of the group tax payable in any year has to be calculated for all profit-making divisions or business units. (pp. 12–13)

The following section, 'Research methodology: An equitable (proportional) tax rate', explains how to derive and calculate an equitable tax rate.

Research methodology: An equitable (proportional) tax rate

In a group scenario, the profits of profit-making divisions are reduced by the losses of loss-making divisions before tax payable is calculated. Put in another way, if the revenue of each division is equal, then the higher costs of the loss-making divisions add to the lower costs of the profitable divisions, thus reducing the overall taxable profit payable by the group. In general terms, the following equations can describe the scenarios with respect to corporate structure and corporate tax liability in any applicable year.

Total tax liability in a year for a group of n number of divisions each numbered i =1 to n:

$$T_d = t\left(\sum_{i=1}^{n} Pi - \sum_{i=1}^{n} Li\right) = t\sum_{i=1}^{n}(Pi) - t\sum_{i=1}^{n}(Li) \qquad \text{[Eqn 3]}$$

Where: t = the corporate tax rate; *Pi* = pre-tax profit of profitable division i; *Li* = loss of loss-making division i; and T_d = total tax liability of group of divisions.

On the other hand, total tax liability in a year for the same divisions above treated as separate companies, noting that loss-making companies pay zero tax is given by:

$$T_s = t\sum_{i=1}^{n}(Pi-0) = t\sum_{i=1}^{n} Pi \qquad \text{[Eqn 4]}$$

Where: t = the corporate tax rate; *Pi* = pre-tax profit of profitable company i; T_s = total tax liability of group of divisions treated as separate companies.

It therefore follows that the difference between the tax liabilities as a group of divisions versus those as separate companies would be:

$$T_s - T_d = \left[\sum_{i=1}^{n} Pi - \left\{t\sum_{i=1}^{n}(Pi) - t\sum_{i=1}^{n}(Li)\right\}\right] \qquad \text{[Eqn 5]}$$
$$= t\sum_{i=1}^{n}(Li)$$

Where: t = the corporate tax rate; *Pi* = pre-tax profit of profitable company/division i; *Li* = loss of loss-making company/division i; T_s = total tax liability of group of divisions treated as separate companies; and T_d = total tax liability of group of divisions.

Thus, in any tax year, the aggregation of divisions incorporated as separate companies or subsidiaries are liable to pay more tax than the corporate group, consisting of unincorporated divisions by an amount equal to the sum of losses of the loss-making divisions, which illustrates how the losses of loss-making divisions within a group offset or dilute the profits of profit-making divisions in reducing the tax liability of the group, leaving the group with comparatively more available cash.

If one or more of the divisions in the group are regulated entities, with tax being calculated separately as part of an RR regulatory approach, and tax is calculated on the basis of a pass-through at the corporate tax rate (t), then this could result in:

- disproportionately larger tax contribution by regulated divisions towards group tax than unregulated divisions
- the group obtaining much more cash from the regulated divisions than is fair for the payment of tax by the group
- unfairness to the users of the services of the regulated divisions, as they would be required to pay higher prices to make up higher RR than proportionally necessary for their contribution to group tax.

One way for regulators to determine a fair approach to the calculation of taxes for regulated divisions within a group and within the RR methodology is to determine an equitable tax rate. The formula of an equitable tax rate (t_e), which, when applied to all profitable divisions treated as separate companies, must result in the tax applicable when the corporate tax rate (t) is applied to the aggregate profits of the group of divisions. In mathematical terms:

Noting from above, that $T_s = t\sum_{i=1}^{n}(Pi-0)$, and $T_d = t\left(\sum_{i=1}^{n} Pi - \sum_{i=1}^{n} Li\right)$ Therefore, to determine t_e as outlined in the problem statement above:

$$t_e \times \sum_{i=1}^{n} Pi = t\left(\sum_{i=1}^{n} Pi - \sum_{i=1}^{n} Li\right)$$

$$\text{or,} \qquad t_e = t\frac{\left(\sum_{i=1}^{n} Pi - \sum_{i=1}^{n} Li\right)}{\sum_{i=1}^{n} Pi} \qquad \text{[Eqn 6]}$$

but the term $\left(\sum_{i=1}^{n} Pi - \sum_{i=1}^{n} Li\right)$ is equivalent to the aggregate taxable profit of the group (which accounts for divisional losses), which can be written as P_g.

Thus, from the equations above, it is clear why the Regulator Record of Decision (Ports Regulator of South Africa 2017b:13) concludes that the equitable tax rate (t_e) applicable to any of the profit-making divisions in a financial year will thus be the corporate tax rate multiplied by the (Transnet pretax profit and divided by the sum of profits of profitable divisions or segments):

$$t_e = t\left(P_g / \sum Pi\right) \qquad \text{[Eqn 7]}$$

Where: t_e = equitable tax rate, t = the corporate tax rate, P_g = Transnet Group total pre-tax profit for the financial year, and ΣPi = the sum of pre-tax profits of profitable divisions or segments for the financial year.

The method for the determination of an equitable tax rate requires two other sets of data, namely the group profit on a year-on-year basis, as well as group segmental data, which shows either the revenues or costs associated with each division or business unit (segmental income statement) or pre-tax profit and loss data per division in the year. In this case it is the Transnet Group, within which the NPA is a division. In addition, it would be useful for such data to have been published over a number of years in order to determine a reasonable moving average of an equitable rate that can be applied in any 1 year and readjusted using the 'claw-back' variable within the RR formula used by regulators.

The equitable tax rate formula in future would thus be applied as follows (Ports Regulator of South Africa 2017b): it would be applied for the NPA as a profit-making division; it would use the claw-back mechanism to readjust the estimated equitable tax rate when audited segmental financials become available; it would be used in the calculation of cost of equity (resulting in a higher return); it would use a 5-year moving average of previously calculated 'actual' equitable tax rate and then utilise the claw-back to readjust for the actual equitable tax rate for the applicable year. The application of the equitable tax rate calculation would be on condition that the Transnet Group annually publish segmental financials that have been audited, for the group and each division, otherwise the regulator will not provide for tax in the RR, and the RR tax allowance would be considered to be already allowed within the profit allowed (Ports Regulator of South Africa 2017b).

Results and discussion: Application of the equitable tax rate in the regulation of South Africa's ports

This section applies the equitable tax rate approach to segmental financial data that was collected from published Transnet Annual Reports from 2011 to 2017. The Transnet divisional profits and losses relative to the Group profits are recorded in Table 1 for five divisions, namely the NPA, TPT, Transnet Freight Rail (TFR), Transnet Pipelines (TPL) and Transnet Engineering (TRE). All other business units including head office are recorded as all other segments. The total taxable group profit is the arithmetic sum of each of the divisional profits including all other segments and elimination of intersegmental transactions.

Table 1 shows the losses and profits of divisions and segments from 2011 to 2017, as a percentage of group profits. The NPA contribution to group profits has been both consistent and high over the period that it has been regulated. Transnet Freight Rail has on many occasions exceeded the NPA profits but has also shown some years of poor profitability as well as losses. Transnet Pipelines as a regulated division has also shown consistent profitability, with TRE showing profits in some years and losses in others. In particular, in examining the 2016 financial year, it is clear that the NPA recorded a profit close to thrice that of the group as a whole because of the lowest aggregate divisional profit and the largest aggregate divisional loss incurred by the group over the 7-year period under consideration. In this regard, it is not impossible to conceive that the taxation allowed by the Ports Regulator covered the tax liability of the group as a whole and even contributed to profits of the group and that this may legitimately be regarded as an unfair burden on port stakeholders, who cover this RR through user charges for the use of port infrastructure owned by the NPA as well as for related marine services performed by the NPA. Taxation allowed for in the RR of the NPA amounted to R889 million, for the financial year ending 2016, while the profit tax payable on the R1468m group profit was only R411m. This implies that a division within a group benefited from a tax allowance that was 216% of what its group was actually liable to pay to the tax authorities for that financial year.

Table 2 aggregates the sum of all profitable segments as well as all loss-making segments in the Transnet Group for the financial years under consideration and calculates the equitable tax rate for each financial year. As expected, the equitable tax rate in each year is significantly lower than the 28% corporate tax rate on profits. The average equitable tax rate over the 7-year period was calculated at 15.73%.

In any year, regulators are obliged to provide a tariff before segmental results on profits are known, and the tariff contains within it, the revenue required for the tax liability for the regulated entity as per the RR regulatory methodology. When the corporate tax rate was taken for granted as the correct rate, 28% was always used. Once it was realised that this resulted in unwarranted revenue, an approximate tax rate had to be used and then corrected in the following year through the claw-back mechanism allowed for within the RR

TABLE 1: Transnet divisional profits and losses as a percentage of group profits.

Financial year	NPA profit as % group profit	TPT profit as % group profit	TFR profit as % group profit	TPL profit as % group profit	TRE profit as % group profit	All other' profit as % group profit	Elimination profit as % group profit	Profitable divisions as % group profits	Loss divisions as % group profits
2017	68.79	28.91	35.76	65.74	-37.68	-67.20	5.67	204.88	-104.88
2016	278.54	67.85	-22.96	83.99	-28.81	-294.28	15.67	446.05	-346.05
2015	43.08	9.70	78.30	22.45	1.33	-51.34	-3.52	154.86	-54.86
2014	59.58	3.28	72.45	23.11	3.50	-53.45	-8.47	161.92	-61.92
2013	44.78	3.61	83.93	21.07	16.92	-54.69	-15.61	170.30	-70.30
2012	53.40	12.26	56.93	20.54	11.02	-41.02	-13.14	154.16	-54.16
2011	70.10	12.79	33.82	8.35	13.77	-27.69	-11.14	138.83	-38.83

Source: Author compiled and calculated from: Transnet annual financial statements: segmental reports (Transnet 2012, 2013, 2014, 2015, 2016, 2017, 2018)

Note: Please see the full reference list of the article, Fakir, M. & Chasomeris, M.G., 2022, 'Ports regulation in South Africa: An equitable tax rate approach', *Journal of Economic and Financial Sciences* 15(1), a736. https://doi.org/10.4102/jef.v15i1.736

NPA, National Ports Authority; TPT, Transnet Port Terminals; TFR, Transnet Freight Rail; TPL, Transnet Pipelines; TRE, Transnet Engineering.

TABLE 2: Calculation of equitable tax rate (%) from divisional profit and loss (R'million) data.

Financial year	NPA	TPT	TFR	TPL	TRE	All other segment	Inter-segment elimination	Total group profit	Σ profit units	Σ loss units	Equitable tax rate: t_e(%)
2017	2934	1233	1525	2804	-1607	-2866	242	4265	8738	-4473	13.67
2016	4089	996	-337	1233	-423	-4320	230	1468	6548	-5080	6.28
2015	3270	736	5943	1704	101	-3897	-267	7590	11754	-4164	18.08
2014	4251	234	5169	1649	250	-3814	-604	7135	11553	-4418	17.29
2013	2705	218	5070	1273	1022	-3304	-943	6041	10288	-4247	16.44
2012	3333	765	3553	1282	688	-2560	-820	6241	9621	-3380	18.16
2011	3990	728	1925	475	784	-1576	-634	5692	7902	-2210	20.17
										Ave. t_e:	15.73

Source: Author compiled and calculated from Transnet annual financial statements: segmental reports (Transnet 2012, 2013, 2014, 2015, 2016, 2017, 2018)

Note: Please see the full reference list of the article, Fakir, M. & Chasomeris, M.G., 2022, 'Ports regulation in South Africa: An equitable tax rate approach', *Journal of Economic and Financial Sciences* 15(1), a736. https://doi.org/10.4102/jef.v15i1.736

NPA, National Ports Authority; TPT, Transnet Port Terminals; TFR, Transnet Freight Rail; TPL, Transnet Pipelines; TRE, Transnet Engineering.

calculations. It makes sense that instead of using the maximum of the corporate tax rate and then clawing back on this after actual segmental results are published, the average equitable tax rate over several years should be used as a closer approximation of what the actual equitable rate will be when it is published. The claw-back mechanism may then be used to adjust the tax revenue either upwards or downwards as may be appropriate.

Table 3 demonstrates that the application of the equitable tax rate in each year, to the aggregate of the profitable segments in the group, yielded the exact profit tax on the group profit at the 28% corporate tax rate. Figures in the last column calculated by applying the equitable tax rate to the sum of profitable segments or divisions ($t_e \times \Sigma Pi$) exactly equal figures in the third column calculated from applying the corporate tax rate to the group profit ($t \times P_g$). This is theoretically demonstrated below as follows:

If: $t_e \sum P_i = tP_g$

It means: $t_e (P_1 + P_2 + P_3 + \ldots + P_n) = tP_g$

which implies that: $t_e P_1 + t_e P_2 + t_e P_3 + \ldots + t_e P_n = tP_g$ [Eqn 8]

Where: t_e = equitable tax rate; t = the corporate tax rate; P_g = Transnet Group pre-tax profit; ΣPi = The Sum of profits of profitable divisions; and P_1, P_2, P_3, … ,P_n = Individual profits of each profitable segment numbered 1 to n.

This confirms that if the equitable tax rate as derived is applied to the profits of each profitable division separately, their tax contributions to the group will in aggregate amount to the group tax at the corporate tax rate (tP_g). Thus, a much lower tax rate, the equitable tax rate, applied to the profits of the profitable divisions in each financial year, is sufficient to fund the full annual tax liability of the group albeit that the group pays tax at the higher corporate tax rate of 28%. Thus, a regulator may exercise this equitable tax rate approach for the calculation of an equitable tax share for the particular regulated division within a group, regardless of the non-regulated divisions, as long as their audited segmental pre-tax profit and loss information is made available.

More importantly for regulation is that a regulator of a divisional entity may apply a lower tax rate in calculating the tax allowance for the RR of the regulated entity, thus saving the users of the services of the regulated entity money, as long as the lower tax rate that is applied equates to the equitable tax rate as derived. This is because it is only at the equitable tax rate that the tax allowed for the regulated division will comprise the fair share of that division (as one among all profitable divisions) towards the tax liability of the group as a whole, at the corporate tax rate.

Only when there are no loss-making segments or divisions within the group will the sum of profits of profitable divisions equal the group profit, and only then will the equitable tax rate reach its maximum value, equaling the corporate tax rate. That is, in the equation $t_e \Sigma P_i = tP_g$, if $\Sigma P_i = P_g$, then it follows that under this condition $t_e = t$. For as long as there are loss-making segments or divisions, the group profit will be smaller than the aggregate of profits of profitable divisions, and the equitable tax rate will be lower than the corporate tax rate.

TABLE 3: Calculation of tax on group profit at 28% compared to application of the derived equitable tax rate to profitable segments (R million).

Financial year	Total group pretax profit	28% Corporate tax rate on group profit ($t \times P_g$)	Sum of profitable segments	Sum of loss-making segments	Equitable tax rate: $t_e = t(\Sigma Pi-\Sigma Li)/\Sigma Pi$ (%)	Equitable tax rate applied to sum of profit segs ($t_e \times \Sigma Pi$)
2017	4265	1194.20	8738	-4473	13.67	1194.20
2016	1468	411.04	6548	-5080	6.28	411.04
2015	7590	2125.20	11754	-4164	18.08	2125.20
2014	7135	1997.80	11553	-4418	17.29	1997.80
2013	6041	1691.48	10288	-4247	16.44	1691.48
2012	6241	1747.48	9621	-3380	18.16	1747.48
2011	5692	1593.76	7902	-2210	20.17	1593.76

Source: Author compiled and calculated from Transnet annual financial statements: segmental reports (Transnet 2012, 2013, 2014, 2015, 2016, 2017, 2018)

Note: Please see the full reference list of the article, Fakir, M. & Chasomeris, M.G., 2022, 'Ports regulation in South Africa: An equitable tax rate approach', *Journal of Economic and Financial Sciences* 15(1), a736. https://doi.org/10.4102/jef.v15i1.736

TABLE 4: Calculation of tax savings to port users if the derived equitable tax rate to profitable segments method was applied instead of the corporate tax rate of 28% (R million).

Financial year	NPA tax allowed in revenue as per PRSA ROD	Equitable tax rate: $t_e = t(\Sigma Pi-\Sigma Li)/\Sigma Pi$ (%)	NPA tax allowance if equitable tax rate (t_e) was used instead of (t)	Savings to port users if equitable tax rate was used	Percentage reduction in tax allowance
2017	1050	13.67	512.50	537.50	51.19
2016	889	6.28	199.31	689.69	77.58
2015	768	18.08	495.93	272.07	35.43
2014	1005	17.29	620.68	384.32	38.24
2013	959	16.44	563.11	395.89	41.28
2012	342	18.16	221.85	120.15	35.13
2011	816	20.17	587.78	228.22	27.97%
				2627.84	**43.83%**

Source: Author compiled and calculated from ports regulator records of decision (Ports Regulator of South Africa 2011, 2012, 2013b, 2014b, 2015, 2016a, 2016b)

Note: Please see the full reference list of the article, Fakir, M. & Chasomeris, M.G., 2022, 'Ports regulation in South Africa: An equitable tax rate approach', *Journal of Economic and Financial Sciences* 15(1), a736. https://doi.org/10.4102/jef.v15i1.736

PRSA ROD, Ports Regulator of South Africa Record of Decision; NPA, National Ports Authority.

TABLE 5: Addressing the disproportionality: Previous allowed tax vs equitable tax rate as % group tax.

Financial year	Total group profit	28% Corporate tax on group profit	Tax allowed in NPA revenue as per PRSA ROD	NPA tax allowed as % group tax liability	NPA tax allowance if equitable tax rate was used	Equitable tax rate as % group tax liability
2017	4265	1194	1050	87.94	512.50	42.92
2016	1468	411	889	216.30	199.31	48.49
2015	7590	2125	768	36.14	495.93	23.34
2014	7135	1998	1005	50.30	620.68	31.07
2013	6041	1691	959	56.71	563.11	33.30
2012	6241	1747	342	19.58	221.85	12.70
2011	5692	1594	816	51.19	587.78	36.87

Source: Author compiled and calculated from: Transnet annual financial statements: segmental reports (Transnet 2012, 2013, 2014, 2015, 2016, 2017, 2018); Ports regulator records of decision (Ports Regulator of South Africa 2011, 2012, 2013b, 2014b, 2015, 2016a, 2016b)

Note: Please see the full reference list of the article, Fakir, M. & Chasomeris, M.G., 2022, 'Ports regulation in South Africa: An equitable tax rate approach', *Journal of Economic and Financial Sciences* 15(1), a736. https://doi.org/10.4102/jef.v15i1.736

PRSA ROD, Ports Regulator of South Africa Record of Decision; NPA, National Ports Authority.

Table 4 shows a comparison of tax allowed by the Ports Regulator versus tax allowance calculated using the equitable tax rate formula for each financial year from 2011 to 2017. The equitable tax rate result in each year is significantly lower than the tax previously allowed, thus indicating that the use of this method could result in substantial savings to port users. Specifically, a saving of between a low of 27.97% in 2011 to a high of 77.58% in 2016. If the method had been used from the outset, then the average percentage reduction in tax revenues for the 7-year period would have been 43.83%. In quantitative terms, this would have amounted to an aggregate saving for port users of just over R2.6 billion (US$187m) over the 7-year period.

While future savings to port users depend on the profitability of each of the divisions and the overall profits of the Transnet group going forward, as these are the determinants of the equitable tax rate approach, possible savings to port users in 2016 and 2017 years are over R500m per year ($36m). It is therefore not inconceivable that the use of the equitable tax rate approach could save port users similar significant amounts in future.

Table 5 shows that the NPA's calculated equitable tax liability was consistently below 50% of the group tax liability in all financial years, even in 2016 when the largest division in the Transnet Group, TFR made a loss. This makes much more sense as the NPA is only one of five of the usual profit-making divisions, albeit its profit has been consistently large over the years of regulation. The spread between the smallest (12.7%) and largest (48.48%) tax derived from the use of the equitable tax rate (as a percentage of the group tax) has also narrowed, as compared to the previously allowed tax, which is spread between 19.58% and 216.30%, respectively. This indicates greater consistency of resulting tax burden to users. Table 5 also confirms that the use of the equitable tax rate does not result in the divisional tax allowance exceeding the group tax liability in any year, indicating greater fairness and potential future savings to users.

Conclusion

The simple pass-through of corporate tax rates by regulators using rate of return regulation in the economic regulation of unincorporated divisions of an unregulated corporate group results in unfairly high prices to users and excess revenue to the group. In South Africa, it has been observed by the Ports Regulator that a tax allowed at the corporate tax rate of 28% on the NPA profit as a part of the RR calculation has been excessive when compared to what the Transnet Group was liable to pay as tax in any particular year, over the period when the 'tax pass-through' approach was in effect. While an allowance of 28% of profit for the NPA would have been fair if it was a subsidiary or a 'standalone' company directly paying its taxes to the tax authorities, while it is still a division, the only fair rate that a regulator should use for the calculation of allowed revenue for taxes should be the equitable tax rate.

As compared to a pass-through approach, the equitable tax rate takes into account the losses of the loss-making divisions, segments or business units that are part of the group, and further, the principle of proportionality is applied between the profitable divisions in apportioning and sharing the tax burden in relation to the size of their profits. The use of the equitable tax rate as opposed to a pass-through approach also ensures that in no period is the tax allowed by the Regulator more than the tax liability of the group as a whole. The equitable tax rate approach therefore addresses this anomaly, which is characterised by an unfair price burden on the users of goods and services of regulated divisions, as well as unfair windfall profits for an unregulated group (the Transnet Group) from its regulated division(s) (the NPA and TPL).

The equitable tax rate formulae derived for the calculation of an appropriate tax allowance in this context, used with the claw-back mechanism, forms a pragmatic system of addressing this problem, as it is simple in its conception and easily implementable without onerous data constraints. Its practical implementation shows how the NPA administered prices could be lowered. Specifically, calculations using Transnet's annual segmental financial statements show that over the period 2011–2017, by applying the equitable tax rate (average of 15.73%) as opposed to a pass-through tax rate (28%), NPA revenue would have been R2.6bn (US$187m) lower, a substantial saving for port users and the South African economy.

Continuing to apply this approach could result in future annual savings of about R500m per annum (US$36m) for port users if the NPA remains a division. However, if it is

incorporated as a subsidiary, as required by the National Ports Act, then the original 'pass-through' approach of the prevailing corporate tax rate adopted previously by the Ports Regulator, in anticipation of the imminent implementation of the Act, should resume.

As this article attempts to make a contribution on a methodological aspect and a circumstantial legal variation in the practical application of the rate of return economic regulatory methodology as adopted in a South African ports context, it will refrain from making any judgement on the repayment or the attribution of blame for the substantial amount of additional taxation allowed over the period concerned, in the absence of guidance on such circumstances within the body of knowledge of the rate of return methodology. It is also not within the scope of the study to calculate the revenue loss to the tax authorities resulting from the non-implementation of the corporatisation law.

However, to its credit, it is noted that the Ports Regulator board of 2015–2018 did not just blindly apply an academic interpretation of rate of return methodology. Rather, it both recognised the circumstantial issues at play, as well as derived the necessary equitable tax formula and thus modified its implementation of rate of return regulation in fairness and to the benefit of port users. It is therefore complimented on standing true to its principles in service to the ports' community and the wider economy, as well as for its academic contribution to the modification and application of economic regulatory methodology.

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Competing interests

Author M.F. is the ex-CEO of the Ports Regulator of South Africa.

Authors' contributions

M.F. collected the data and was the lead author writing up the article. Both authors contributed to the conceptualisation of the research, analyses and writing of this article. M.F. was registered for a PhD and supervised by M.G.C.

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Data availability

The data are provided in the tables found in the article.

Disclaimer

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