



IMPACT OF CONTROLLING RAILWAY FARES ON THE FINANCIAL SHORTFALL OF SRI LANKA RAILWAYS (SLR)

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ABSTRACT

Although envisaged as the means of delivering an attractive and efficient mode of public transport, Sri Lanka Railways (SLR) has incurred a financial shortfall since the mid-1900s. To overcome this financial shortfall SLR, a government department needs to adopt strategies that enhance its total revenue or reduce recurrent expenditure. Passenger revenue and freight revenue are major components of the total revenue of SLR. These are determined by fares and the volume of passenger and freight transport. This study examines the impact of government controls on railway fares on the financial shortfall of SLR. To do this, it analyses the effects of the railway passenger and freight revenue components of the financial statements from 1977 to 2018. An in-depth descriptive and graphical analysis is performed using secondary data to find the impact of these variables. The study ascertains that the long-term financial shortfall of SLR is attributable to two factors: SLR charges relatively low passenger fares charged by SLR compared with public bus transport, and it does not revise its fares in line with changes in the bus. This study recommends that decision-makers and planners formulate a railway fare policy that is revised in line with bus fares and adopt measures to enhance the quality and level of service delivered by SLR.

Keywords: Sri Lanka Railways, financial shortfall, railway fares, passenger revenue, rail transport, freight revenue

1. INTRODUCTION

Sri Lanka Railways (SLR), formerly named Ceylon Government Railways (CGR), was founded in 1858 to provide rail transport facilities to passengers and freight. Rail transport in Sri Lanka provides many economic benefits to society, providing accessibility and mobility for people and goods. Although envisaged as an attractive and efficient mode of public transport, SLR has encountered a financial shortfall since the mid-1900s. In 1941, it incurred a percentage of loss (shortfall) to earnings of 22.2%. This figure gradually increased to 94% in 2018, reflecting weak financial performance from profit-making to loss-making services [1].

In its early stages, the railway was a dominant mode of freight transport, yielding substantial revenue and profitability. Freight movement by rail considerably declined during the 1930s, and the railway began to return a continual financial shortfall thereafter. Freight transport switched to lorries, and passenger transport by buses became more common; this was parallel to post-Independence developments in road transportation networks and facilities. According to Kumarage [2], “the lack of administrative flexibility provided to a government department has been cited as the reason for the inability to implement changes required for the railway to be translated to a commercially viable institution.” As a result, railways no longer commanded a monopoly over freight transportation, freight revenue continuously decreased, and the gap between revenue and expenditure expanded. As per SLR statistics [1], freight earnings represented 27% of total earnings in 1977, declining to 6% in 2018, reflecting a significant decline in freight transport by rail. In contrast, passenger earnings as a share of total earnings increased from 60% in 1977 to 80% in 2018, reflecting the rapid growth of passenger transportation.

According to [3], even though total revenue at current prices increased, at constant prices, total revenue continually declined: recording an Average Annual Growth Rate (AAGR) of -0.35% from 1977 to 2018. This was due to the contraction of both passenger and freight. On the other hand, the AAGR of total operational (recurrent) expenditure was 0.91%. The study further showed that the AAGR of financial shortfall in constant prices increased by 5.4%, reflecting weak financial performance during the past four decades: low revenue generation has contributed significantly to this. The (operating) ratio of working expenses to revenues exceeding 100% reflects ineffective financial performance, such as. In 1977, the Operating Ratio was 142%, which increased to 194% in 2018.

As a government department, SLR needs to adopt strategies to mitigate this financial shortfall, which will minimise the burden on the government and improve rail passenger and freight transport as a significant public transport mode in Sri Lanka.

Thus, SLR should endeavour to minimise continuing financial shortfall in railway operations by enhancing its total revenue or reducing recurrent expenditure.

Passenger revenue and freight revenue are the major components which represent 85% of the total revenue of SLR. These are determined by fares (price) and the volume of passenger and freight transport (quantity). This study focused on ascertaining the impact of government controls on railway fares on the financial shortfall by analysing the financial and operational attributes of rail transport from 1977 to 2018. The study provides insight into viable solutions that policy decision-makers and planners may adopt to minimise the gap between revenue and expenditure of SLR, focusing on both railway passengers and freight fares.

2. LITERATURE REVIEW

According to Hayes [4], a financial shortfall is a condition in which a company or individual cannot generate sufficient revenues or income, making it unable to meet or pay its financial obligations. If any railway undertaking records a continual financial shortfall, it burdens the economy enormously. Price is the most important factor for determining revenue and expenditure: this directly impacts producer and consumer behaviour in decision-making. In economic theory, pricing is a method of resource allocation in producing goods and services. Firms set optimal prices to maximise their objectives according to the different market conditions they face [5]. Businesses have different pricing objectives, such as profit maximisation and welfare maximisation, to ensure the highest sales revenue, adequate security or market share ([5], [6], [7]). However, there is no general theory or model on the pricing objectives of public enterprises (PE), and the application of varied other theories has created conceptual dilemmas [8]. According to the Median Voter Theorem developed by [9], politicians are elected concerning policy priorities; thus, politicians will reflect the expectations of the median voter in public enterprises. In government departments, pricing and investment decisions are influenced by the political aspiration to maximise votes. As a public entity, SLR sets the pricing of passenger and freight transport services based on government directives. It also has no clear policy for periodic price revisions.

Past research ascertained different revenue and expenditure drivers of the financial performance of railway undertakings. Passenger fares and freight rates are major revenue drivers that directly impact financial performance in rail transportation. According to [10], the primary revenue drivers of railway efficiency and performance are passenger revenue, government subsidies, and track access charges. [11] researched the efficiency of the Pakistan Railway compared with China and India and revealed that the decline in freight revenue and passenger revenue had impacted the

efficiency of Pakistan Railway in comparison with its counterparts in China and India. [12] researched the operating ratio of Canadian railways. They found that railway freight rate increases significantly impact the operational ratio of rail transport in Canada. [13] performed a comparative financial performance analysis between the US and Japanese urban railways. This analysis shows that fare level is a key factor affecting railway undertakings' profitability.

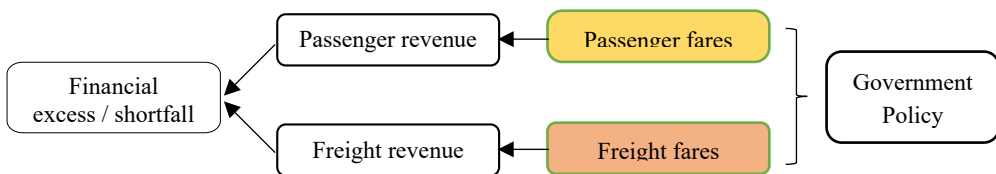
SLR has recorded a sustained financial shortfall since the 1940s due to operational (recurrent) expenditure exceeding total revenue [1]. Parallel to developments in road transportation, SLR faced challenges, including inadequate investment, lack of progressive management and regulations, misdirected rail subsidies, strong trade unions hampering improvements and lack of fare policy. Together, these led to a rapid decline in operational and financial performance over the decades [14]. The depleted assets base, obsolete signal and communication system, and ageing rolling stock fleet of rail transportation severely constrained SLR's delivery of quality service to the travelling public and freight shippers [15]. In addition to implementing a fare policy for rail transport, it is imperative to also address shortfalls in the quality of rail transport provided by SLR.

According to de Silva [16], rail passenger fares and freight rates in Sri Lanka have been revised from time to time, but these revisions did not keep pace with compared with the upsurge in the operational expenditure of railways or take into account the prices of comparable modes of transport. After 1977, railway passenger fares were revised twice in 1983 in line with a fuel price hike and several times thereafter, but these were not in proportion to the increase in expenditure [17]. Since government-owned railways (including in India, Bangladesh, and EU countries) were monopolies, regulatory pricing focused on maximising social welfare resulted in growing operating deficits during the 1970s and 1980s. The result was that most governments were forced to increase subsidisation [18]. For instance, the inadequate pricing policies and low passenger fares in Indian Railways compared with the cost structure and other substitutes have impacted financial shortfall [19] from passenger transportation. [20] researched reforms to SLR based on international experience and industry expert opinions. The research identified the pricing of tickets as one of the key areas for improvement. As per the study of [3], the diminishing market for freight transport, inadequate fare revisions, rapid escalation of fuel expenditure, and increasing salaries and wages are the major revenue and cost drivers which contributed to financial losses in SLR. The study further shows that fare revision is significant as it has not adequately contributed to revenue generation, and reasonable fare revisions consistent with the market fuel price will help minimise financial

losses. Literature shows that low rail passenger and freight fares contribute to the financial shortfall in railways.

3. METHODOLOGY

The conceptual framework (Figure 1) for the data analysis was based on the literature survey, discussions with railway experts, and brainstorming. The financial shortfall or excess in the conceptual framework indicates the gap between revenue and recurrent expenditure. Since SLR is a government department, the government policies on railway passenger and freight fares directly impact financial excess or shortfall in passenger and freight revenue.



Source: Author

Figure 1: Conceptual Framework

SLR offers many ticket groups, and there are serious complications in aggregating them. [21] used revenue per kilometre as the fare variable in their study on rail transport in Australia. Accordingly, this study considers passenger revenue per passenger kilometre (PRPK) as the average passenger fare determined by the government and freight revenue per ton kilometre (FRTK) as the average freight fare. Data were collected for the study period from 1977 to 2018 (42 years). The secondary data on revenue and expenditure components were collected from administrative reports of SLR, accounts statements, and other unpublished data collected from relevant SLR sub-departments. In addition, the study collected data from books, journal papers, and articles through websites. Moreover, KPIs in different global railways were captured through published data on statistical websites, such as UIC and World Bank Statistics. In addition, the study collected relevant data from many other government institutions, such as the Central Bank of Sri Lanka, Ceylon Petroleum Corporation, the University of Moratuwa, etc.

The study first analysed the impact of railway passenger fares and freight fares with a comparison of public bus transport and road freight transport. The study estimated the price elasticity of demand for rail passenger transportation to ascertain the impact of passenger fare revisions consistent with the general price level and bus fare revisions. The study used log values of passenger kilometres (LPKM) as the dependent variable and log real values of passenger revenue per passenger kilometre

(LPRPK) and log values of passenger train kilometres (LPTK) as the explanatory variables. The study estimated the price elasticity of demand for rail freight transportation to ascertain the impact of freight fare revisions in line with the general price level. The study used log values of freight ton kilometre (LTKM) as the dependent variable and log real values of freight revenue per passenger kilometre (LFRTK) and log values of freight train kilometres (LFTK) as the explanatory variables (Appendix A).

The descriptive financial data analysis was based on nominal and real data adjusted to the inflation effect (Colombo Consumer Price Index). Data analysis focused on the trends and fluctuations of the financial variables and the factors behind them. The study secondly compared the research findings with the rail networks in Asian countries to ascertain the problems confronted by SLR. The study performed a descriptive graphical analysis using graphs, charts, and tables. Microsoft Excel software program was used to analyse the trend of the time series variables, and EViews software was used to estimate the price elasticities.

4. DATA ANALYSIS

4.1. Passenger Fares

Passenger revenue is generated by ordinary ticket revenue and season ticket revenue, which on average, account for 80% and 20% of total passenger earnings, respectively. The Railway Ordinance states that there is no rule regarding charges for the conveyance of passengers, and goods shall be made without the concurrence of the Minister of Finance. However, the General Manager of SLR is empowered with the discretion of determining the rates of charges with the prior approval of the Minister by any amount [1]. Accordingly, passenger fares are determined by the government and are beyond the control of SLR's management. Although there is no provision in the railway fare policy for annual fare revisions, in certain years, the government has revised passenger fares for all classes (1st class, 2nd class, and 3rd class) and value-added services. The fluctuations of PRPK at current and constant prices are shown in Figure 2. PRPK continually increased at current prices (AAGR=8.2 %) during the study period.

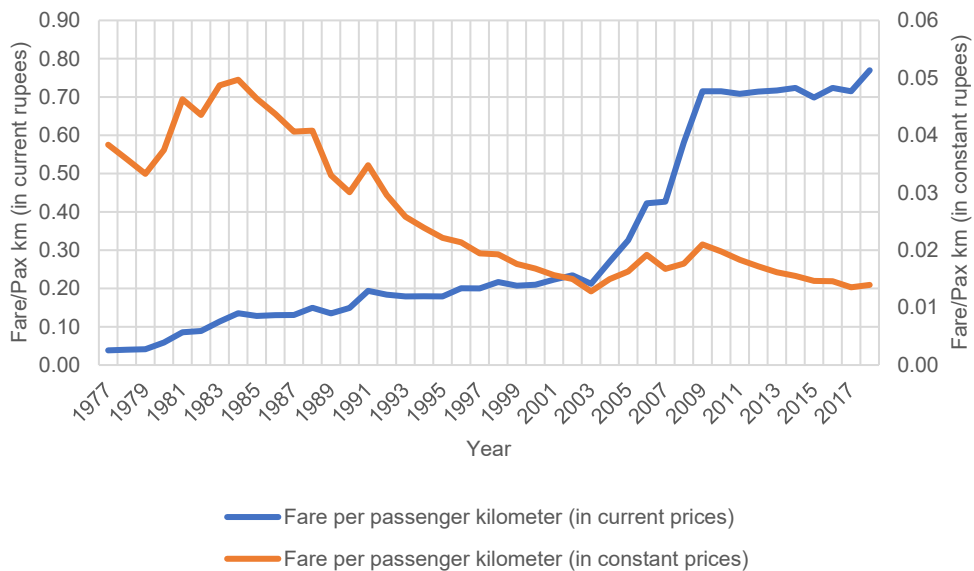


Figure 2: Passenger Revenue per Passenger Kilometre of SLR

PRPK spiked during the 2000s due to several fare revisions by the government in response to an increase in fuel prices, but this was not adequate to absorb the variable cost of operation. After 2008, PRPK showed stable movement due to no fare revisions being adopted up to 2018 and increased passenger volume (passenger kilometres) during this period. At constant prices, the decline of PRPK (AAGR = -1.91) has resulted in low revenue generation from passenger transportation. Currently, SLR's revenue, in the form of fare income, amounts to less than half (around 40 %) of its recurrent expenditure, revealing how low fares have contributed to the financial shortfall.

4.1.1. Comparison of Rail Passenger Fares with Bus Fares

The existing bus operation in Sri Lanka is characterised by poorly equipped regulators in a mixed competitive environment [22]. With the expansion of the road network into rural areas, accessibility to bus transportation increased, and bus transport has become the primary mode of travel replacing rail transport. As per the bus fare policy formed in 2002, bus fares are revised annually in line with the cost of inputs and quality of outputs [22]. Even though railway fares are comparatively lower than bus fares, there is a lack of accessibility in rail transport when compared with bus transport.

PRPK in rail transportation is comparatively less than in the state public bus transportation. The O-51 Report of SLTB in 2018 shows the average fare per passenger-kilometre in the state bus transportation is Rs.1.81 compared with rail transport which is Rs. 0.77. Furthermore, step-on bus fare (step-on fare is the first

fare stage within the first two kilometres) continually increased in line with the fuel price and reached Rs. 12.00 in 2018. Table 1 shows the rail and bus fares within 10km and 20 km in 2018. In comparison, railway fares per kilometre for third-class tickets are very low compared with public bus transport, even though first-class ticket prices do not differ significantly across the two modes. According to [23], most problems in the public transport sector in Sri Lanka are attributable to the absence of a fare policy. The study [23] set out criteria for a fares policy based on costs, quality of service, and subsidy payment if warranted.

Table 1: Bus Fares and Railway Fares - 2018

Railway Fares			Bus Fares		
Type of Service	10 km	20 km	Type of Service	10 km	20 km
1st Class	42.00	80.00	Luxury	55.00	90.00
2nd Class	23.00	44.00	Semi Luxury	42.00	66.00
3rd Class	13.00	25.00	Normal	28.00	44.00

Source: Sri Lanka Railways, National Transport Commission

4.1.2. Impact of the Revision of Railway Passenger Fares

Railway passenger fares have not increased in line with bus fare revisions and other cost variables (fuel price and general price level) during the past four decades, as depicted in Figure 3.

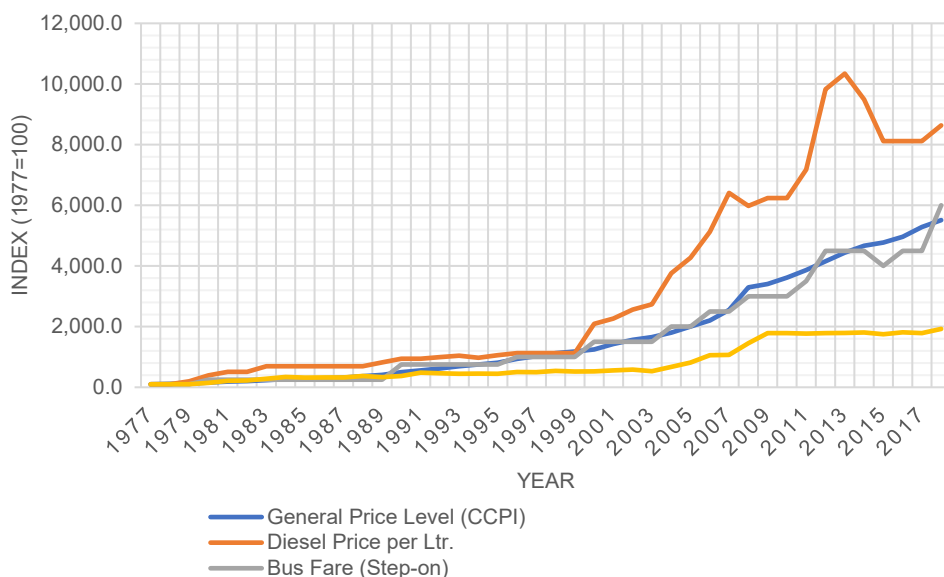


Figure 3: Comparative Growth of Rail Passenger Fares (Fare per Passenger Kilometre)

If the rail passenger fares (PRPK) were revised by the government in keeping with the general price level and bus fare revisions, SLR would have minimised its financial shortfall, as depicted in Figure 4. The estimated value of price elasticity of rail passenger demand which is -0.14 (Appendix A), was applied for this analysis. Data analysis shows (Figure 4) no significant difference between railway and bus fares up to the early 1990s. However, bus fares spiked since the early 1990s in line with increasing fuel prices and general price levels. By increasing railway passenger fares in line with bus fares from 1993 onwards, SLR could have minimised its subsidised annual shortfall and reduced its burden on the government treasury. Moreover, SLR could have earned a profit of Rs. 9.84 per train kilometre in 2018.

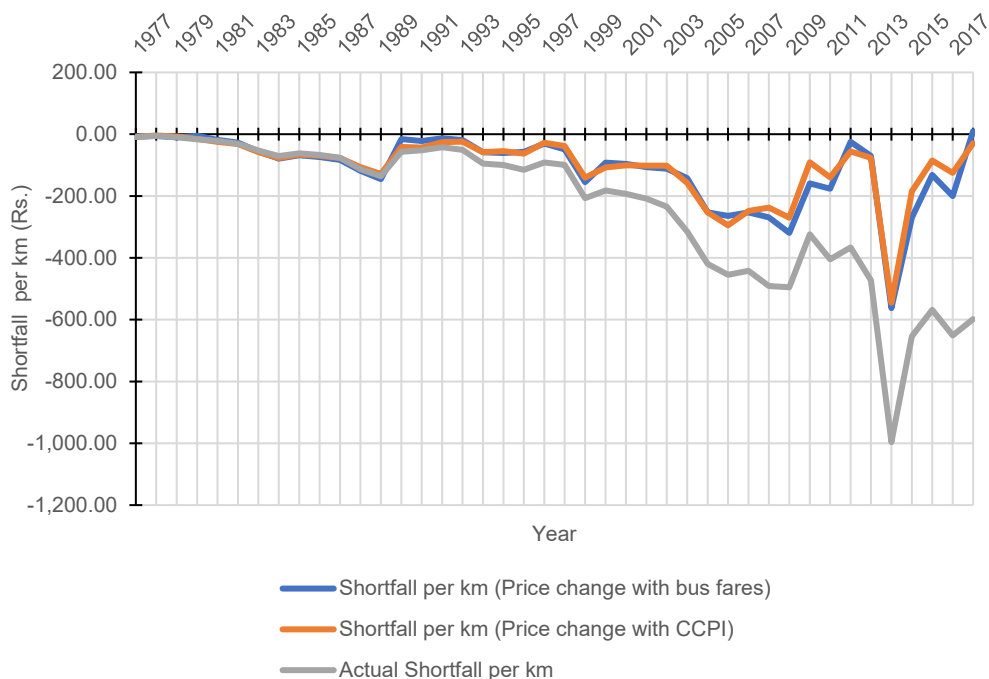


Figure 4: Financial Shortfall with the Changes in Rail Passenger Fares

Buses are the major public transport mode in Sri Lanka and the closest substitute for rail transport. The demand for rail transport is price inelastic [24]. Thus, bus fares are the most important benchmark in demonstrating the impact of railway fares on the financial shortfall.

4.1.3. Comparison of Rail Passenger Fares with Asian Countries

Figure 5 shows the PRPK (average passenger fare) of rail transport and per capita GDP in some Asian countries compared with Sri Lanka. PRPK is much higher in Malaysia and Thailand, which have high per capita GDP. On the other hand, even though the per capita GDP in Sri Lanka is much higher than in other South Asian countries, PRPK is relatively lower than in the selected Asian Countries. This further

reveals that both countries with lower per capita GDP than Sri Lanka and those with higher per capita GDP have relatively higher average rail passenger fares.

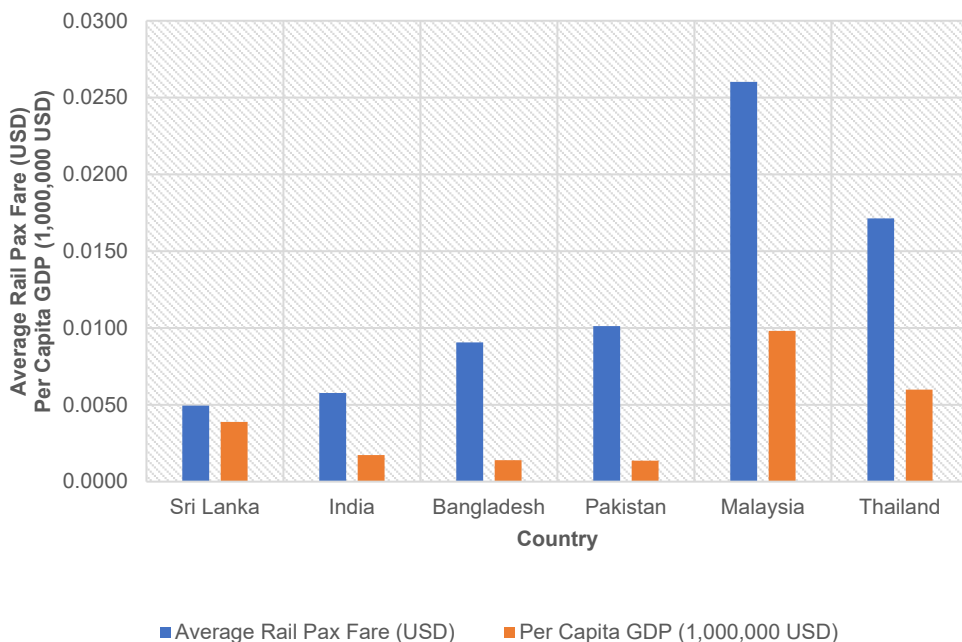


Figure 5: Average Rail Passenger Fare Vs. Per Capita GDP -2016

In India, rail passenger transport is low-priced and operates below break-even. But, due to the surpluses in the goods transport sector, the overall railway transport system is making profits. In the Sri Lankan context, a higher proportion of revenue is generated from passenger transport (Section 1). Thus, fixing rail passenger fares at very low rates and not revising rail passenger fares in line with market price changes (such as fuel price, bus fares, and general price) have contributed to the continued financial shortfall of SLR.

4.2. Freight Fares

The Railway Ordinance vests the authority of making, revoking, adding, or altering rules regarding the charges to be made for the conveyance of goods by railway and the classification of goods to be charged at special rates with the Minister of Transport [1]. Accordingly, the government has the authority to assign freight rates for classes of goods, which is beyond the control of SLR's management. However, General Manager is given the discretion in granting special rates for transporting any goods moved in bulk or block rates of wagons [1]. Railway has a two-tier charging system for goods wherein they are grouped into two classes with different charges for each class. This depends on whether the goods are carried on lines in the low-lying area of the country (below Rambukkana) or lines in the upcountry (above Rambukkana).

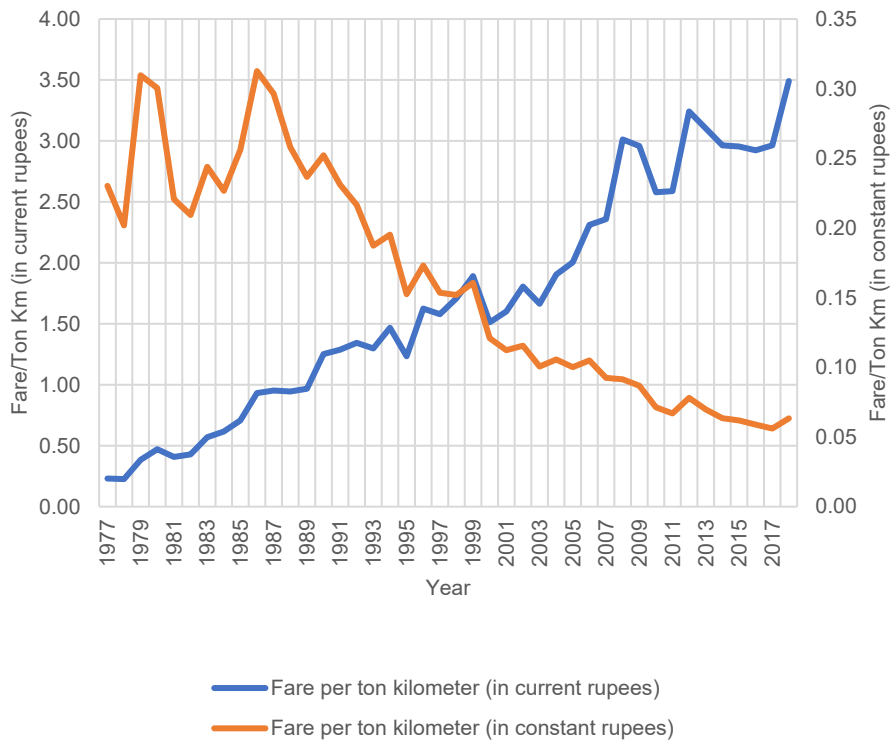


Figure 6: Freight Fare per Ton Kilometre of SLR

Figure 6 shows a positive trend of FRTK in current prices, whereas there is a negative trend in constant prices with fluctuations from 1977 to 2018. The upward revision of freight rates of around 200 % for all commodities was made in 1979. Afterwards, freight rates for different classes of goods were revised by the government for several years, such as 1990, 2001, and 2007 [1], and the freight rates have not been revised after 2007. The changes in freight ton-kilometres impacted the fluctuation of FRTK.

4.2.2. Comparison of Rail Freight Rates with Road Freight Transport Charges

With the development of road freight transport, freight movements took place using trucks, lorries, and containers. Even though road freight transport provides door-to-door service with economic advantages to the transporters, freight transport charges by road are higher than by rail. The price for transporting goods by a lorry in 2009 was Rs. 53.00 per kilometre, which increased to Rs. 62.50 per kilometre in 2018. In addition, the average price for transporting goods by lorries within the Colombo City area was around Rs. 10,000 in 2009, which increased to Rs. 17,500 in 2018 [25]. In comparison, transporting goods by rail (low country) per ton per kilometre is around Rs. 4.00 on average, which is significantly lesser than road freight transport. Petroleum is a major category of freight transported by rail, but the rates for such

transportation have not been revised since 2007. Table 2 shows low rates of transporting fuel by rail compared with road (browsers) transport.

Table 2: Comparison of Fuel Transport Charges between Road and Rail

Area	Fuel transport charges by road browsers (10,000 litres per km)	Fuel transport charges by railway (10,000 litres per km)
Low Country	85.40	32.60
Up Country	97.20	36.10
Aviation Oil	-	47.70

Source: Sri Lanka Railways

SLR provides freight transport using the infrastructure it develops. Unlike road transport, SLR has to incur all the expenditure on rehabilitation and construction of rail tracks, bridges, culverts, signals, and stations which are the principal physical infrastructure of rail transport. Thus, an increase in existing low freight rates for major commodities minimises financial shortfall.

4.2.3. Impact of the Revision of Railway Freight Rates

Figure 7 shows the growth of rail freight fares compared with diesel prices and general price levels.

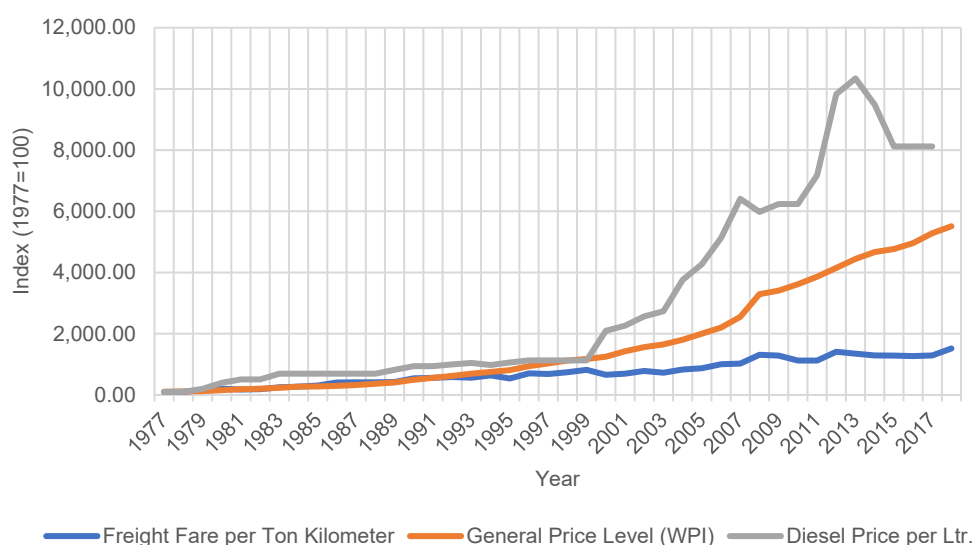


Figure 7: Comparative Growth of Rail Freight Fares (Fare per Ton Kilometre)

This study considered the Wholesale Price Index (WPI). WPI is the most relevant price index to show comparative growth in general price level because the index refers to a mix of agricultural and industrial goods at various production and

distribution stages, including import duties. As described in Section 4.3, similar to railway passenger fares, index values (Figure 7) show that average freight fares have not increased in line with market price changes (diesel price and general price level). The main reason behind this is the government policy of keeping freight rates for all goods relatively stable.

Due to the lack of road freight transport-related cost data over the past four decades, the study used WPI to find the impact of the increase in average rail freight fares in line with the general price level. During the last decade (from 2009 to 2018), lorry transport charges increased by 18% (Section 4.5), and the general price level (WPI) increased by 68%, which is proportionally higher than lorry charges. The estimated price elasticity of rail freight demand is -0.25 (Appendix A). Figure 8 demonstrates that if the freight fares vary with the general price level (WPI), SLR's financial shortfall will decrease by 2%.

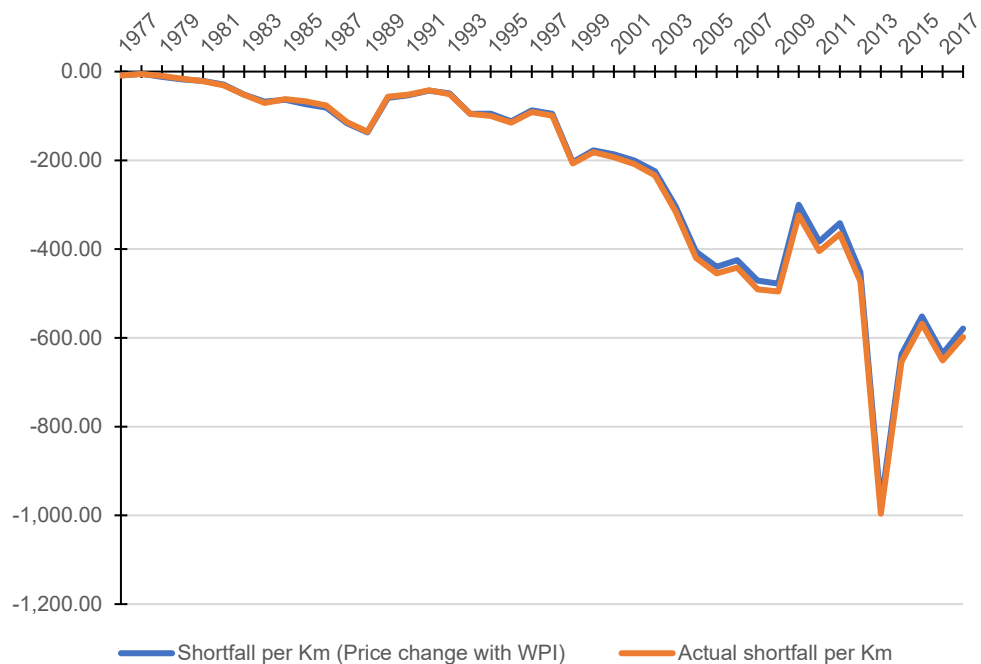


Figure 8: Financial Shortfall with the Changes in Rail Freight Fares

The freight revenue composition in SLR is continually reducing, representing around 5% of total revenue. Thus, an increase in freight fares in line with the general price level has not minimised the financial shortfall of SLR. The growth of road freight transport costs (lorry charges) is less than the growth of the general price level. This reveals that increasing rail freight fares in line with road freight transport tariffs by making them more competitive does not significantly contribute to the reduction in the existing financial shortfall.

4.2.4. Comparison of Rail Freight Fares with Asian Countries

Figure 9 shows the FRTK (average rail freight fare) of rail transport in selected Asian countries compared with Sri Lanka.

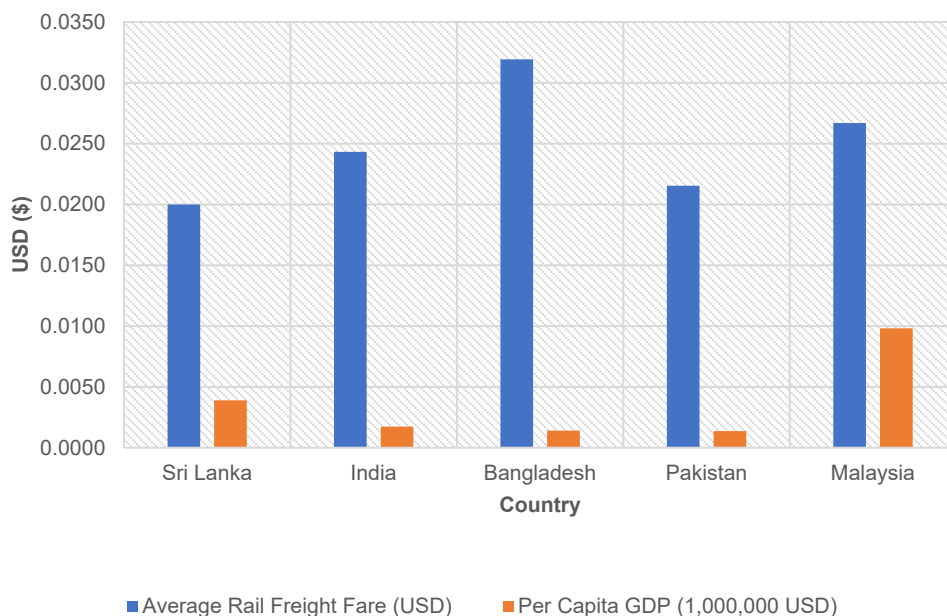


Figure 9: Average Rail Freight Fare Vs. Per Capita GDP -2016

Figure 9 shows that FRTK in Sri Lankan rail transport is comparatively less than in the selected Asian countries. Even though the freight rates of SLR are higher than the passenger fares (In 2018, fare per passenger kilometre and fare per ton kilometre were Rs.0.77 and Rs. 3.49, respectively.), SLR is unable to cross-subsidize the shortfall in rail passenger transport. This is mainly due to the high shortfall from freight transport compared with passenger transport. In 2018, the shortfall from passenger transport was Rs.1.00 per passenger kilometre, and the shortfall from freight transport was Rs. 2.50 per ton kilometre [1].

Many government-owned railways (e.g., EU railways) operate on government concessions below the operating cost by fixing low passenger and freight fares. Thus, many countries are now seeking railway restructuring by turning loss-making state-owned railways into stand-alone enterprises operating on commercial principles [18]. Sri Lanka's rail-based freight business is not at a satisfactory level even though fares are low when compared with road freight transport. An increase in freight fares cannot sufficiently reduce the financial shortfall (Section 4.6) of SLR without adopting a comprehensive restructuring process. Thus, SLR needs to undergo comprehensive restructuring by focusing on an effective pricing policy and service quality.

5. CONCLUSION

Railway fares are a major source of rail transportation revenue, directly impacted by passenger and freight revenue. During the last four decades, total revenue in constant prices decreased continuously due to the decline in both passenger revenue and freight revenue. Since the passenger and freight revenue is determined by the fare level and total passenger and freight volume, the study examined the impact of railway fares on SLR's long-term financial shortfall. The study found that low railway passenger fares compared with bus transportation and not revising rail passenger fares in line with bus fares contributed to the decline in total revenue and the increase in total financial shortfall. Relevant authorities can deliberate on this key research finding when deciding to maximise the total revenue and efficiency level of SLR. Transport policymakers can focus on formulating a railway fare policy in line with the policy for bus fare revisions while taking steps to enhance the quality and level of service. The study did not analyse the effects of all the components in the revenue and expenditure structures which cover other operational and non-operational drivers. Thus, future studies can focus on the impact of additional revenue and expenditure drivers on the financial shortfall of SLR relative to global railway service providers.

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APPENDIX A**Table 1: Estimated Price Elasticity of Demand for Rail Passenger Transportation**

Dependent Variable: LPKM Method: Least Squares Date: 01/01/22 Time: 11:44 Sample (adjusted): 1978 to 2018 Included observations: 41 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006298	0.01464	0.430185	0.6695
LPRPK	-0.138319	0.064506	-2.144286	0.0385
LPTK	0.795099	0.155195	5.123235	0.0000
R-squared	0.446146	Mean dependent var		0.023395
Adjusted R-squared	0.416996	S.D. dependent var		0.119657
S.E. of regression	0.091364	Akaike info criterion		-1.877575
Sum squared resid	0.317201	Schwarz criterion		-1.752191
Log-likelihood	41.49028	Hannan-Quinn criteria.		-1.831917
F-statistic	15.3051	Durbin-Watson stat		1.694997
Prob(F-statistic)	0.000013			

Source: Eviews Software Output Table

Table 2: Estimated Price Elasticity of Demand for Rail Freight Transportation

Dependent Variable: LTKM Method: Least Squares Date: 01/01/22 Time: 11:48 Sample (adjusted): 1978 to 2018 Included observations: 41 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.016562	0.020633	-0.802729	0.4271
LFRTK	-0.247587	0.143789	-1.721878	0.0932
LFTK	0.255117	0.105867	2.409779	0.0209
R-squared	0.176118	Mean dependent var		-0.014754
Adjusted R-squared	0.132756	S.D. dependent var		0.1373
S.E. of regression	0.127862	Akaike info criterion		-1.205369
Sum squared resid	0.621254	Schwarz criterion		-1.079985
Log-likelihood	27.71006	Hannan-Quinn criteria.		-1.159711
F-statistic	4.061549	Durbin-Watson stat		2.1495
Prob(F-statistic)	0.025202			

Source: Eviews Software Output Table