Optimizing Educational Investment Efficiency in Upper Middle-Income Countries: Evidence from Five Emerging Economies

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Abstract. Enhancing the return efficiency of educational investment is a critical challenge for upper middle-income countries as they strive to transition towards high-income status. This study investigates the strategies these countries can adopt to optimize the outcomes of their education spending. Focusing on five representative nations—China, Mexico, Brazil, Thailand, and Malaysia—the research employs World Bank data from 1995 onwards to analyze the relationship between educational resource allocation and economic returns, measured by a defined metric of return efficiency (GDP per capita per unit of educational expenditure). The analysis reveals three primary impediments to efficiency: a widespread misallocation of resources across educational stages, often favoring tertiary education at the expense of basic education; insufficient investment in teacher resources, as reflected in pupil-teacher ratios; and a significant misalignment between educational outputs and labor market demands. To address these challenges, the paper proposes a tripartite policy framework: first, rebalancing public expenditure to prioritize and effectively implement funding for basic education; second, boosting investment in teacher recruitment and training to improve instructional quality; and third, aligning curricula, particularly in tertiary education, with the evolving needs of the economy. The findings offer actionable insights for policymakers aiming to transform educational investments into sustainable economic growth and development.

Keywords: Upper middle-income countries; Return efficiency; Educational investment.

1. Introduction

Education plays a vital role in driving economic and social progress, especially in upper middle-income countries that are striving to sustain development and reduce inequality. While many of these nations have increased public spending on education in recent decades, the returns on such investments—whether measured in economic output or broader social benefits—often fall short of expectations. This paper examines how upper middle-income countries can enhance the efficiency of their educational investments. Focusing on China, Mexico, Brazil, Thailand, and Malaysia, the study seeks to answer the following question: These countries can improve the outcomes of education spending by allocating resources more efficiently, strengthening teacher support, and enhancing coordination between education systems and labor market needs. The issue is particularly relevant at this stage of development. Despite increased enrollment and education budgets, many countries continue to experience uneven learning outcomes, skills mismatches, and persistent social gaps. These challenges suggest that how money is spent may be just as important as how much is spent. By comparing experiences and identifying common obstacles, this study aims to provide practical insights for policymakers trying to maximize the impact of educational investments. The following sections analyze data on spending patterns, human resource inputs, and labor market alignment, offering recommendations tailored to the realities of upper middle-income economies.

2. Definitions

The paper focuses primarily on three key definitions. The first is how to define an upper middle-income country, for which we adopt the classification established by the World Bank based on GNI per capita data from 2024. The second one is how to quantitatively define educational investment. The third definition pertains to the quantitative measurement of return efficiency. These three definitions are quite important because the research object is upper middle-income countries, and this

concept needs to be artificially defined. Meanwhile, return efficiency needs quantitative indicators to be measured. In order to determine the method of measuring return efficiency, it is also necessary to quantitatively measure the concept of educational investment.

2.1. Upper Middle-income Country

According to the definition of the World Bank, upper middle-income economies are those with a GNI per capita between $4,496 and $13,935 [1]. Accordingly, five representative upper middle-income countries were selected for in-depth analysis: China, Mexico, Brazil, Thailand, and Malaysia. The reason for choosing these five countries as the research objects is that they represent Asia (represented by China, Thailand and Malaysia) and South America (represented by Mexico and Brazil), where upper middle-income countries are mainly concentrated. Among them, Thailand and Malaysia also well represent the Southeast Asian region where upper-middle-income countries are concentrated.

2.2. Educational Investment

This study employs World Bank data on "Government expenditure on education, total (% of GDP)" to gauge the level of investment in education across the selected countries. The data is shown in the following figure：

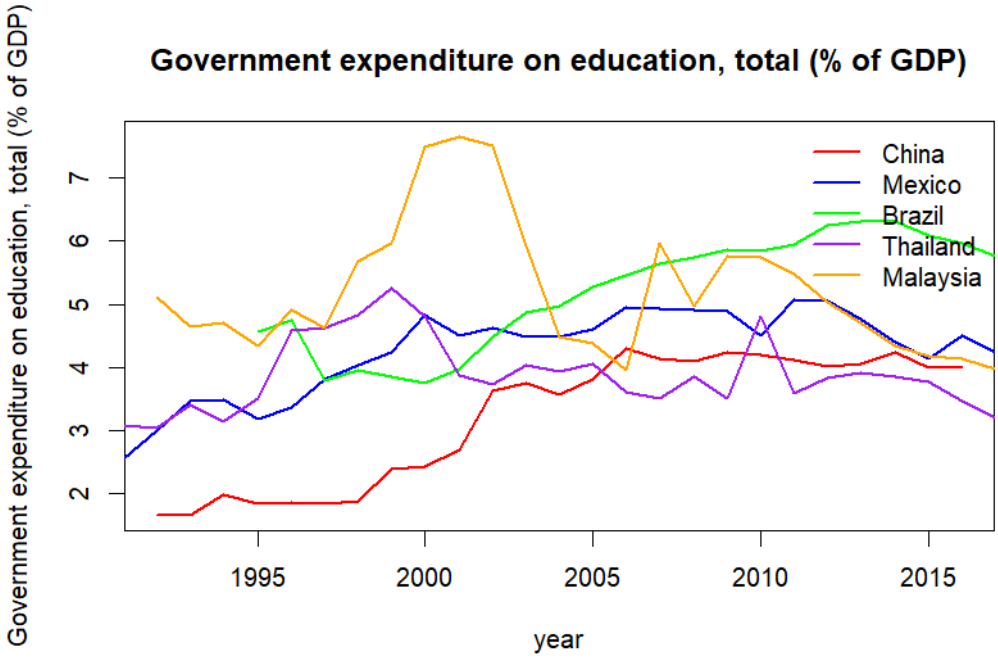

Fig. 1 Government expenditure on education

As illustrated in Fig. 1, the share of government expenditure on education in GDP has increased to varying degrees across all five countries from 1995 to 2010. After 2010, this indicator stabilized at a relatively consistent level, followed by a slight decline in the subsequent period. Notably, Malaysia exhibited a distinct pattern, characterized by a sharp increase around the year 2000 and a subsequent pronounced decrease.

2.3. Return Efficiency

This paper uses GDP per capita to reflect the magnitude of a country's educational achievements. For this purpose, the return efficiency on education is defined as follows：

$$\text{Return efficiency} = \frac{\text{GDP per capita(constant 2015 US\$)}}{\text{Government expenditure on education, total (\% of GDP)}} \quad (1)$$

Where GDP per capita(constant 2015 US$) is the extracted data of the same name from the World Bank.

The definition shows that the greater the "return efficiency" of a country, the more efficient the return on its educational investment. The GDP per capita and the return efficiency defined above of the five countries as the research objectives are shown in the following two figures:

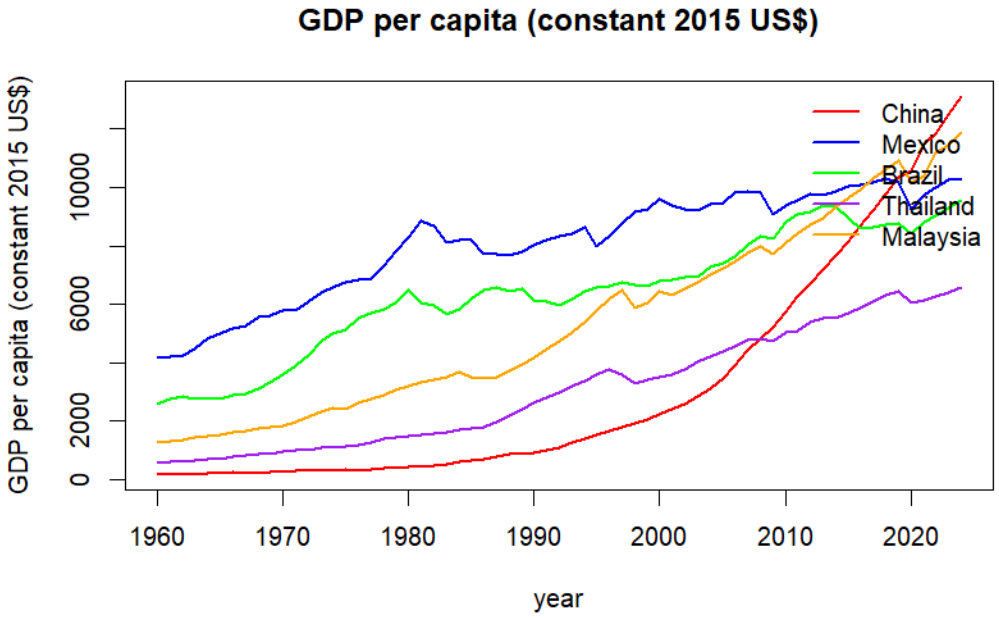

Fig. 2 GDP per capita

As illustrated in Fig . 2, the GDP per capita of these five countries has increased to varying degrees since 1960. However, this does not mean that the return on investment in education is high. Therefore, it is necessary to focus on analyzing Fig. 3.

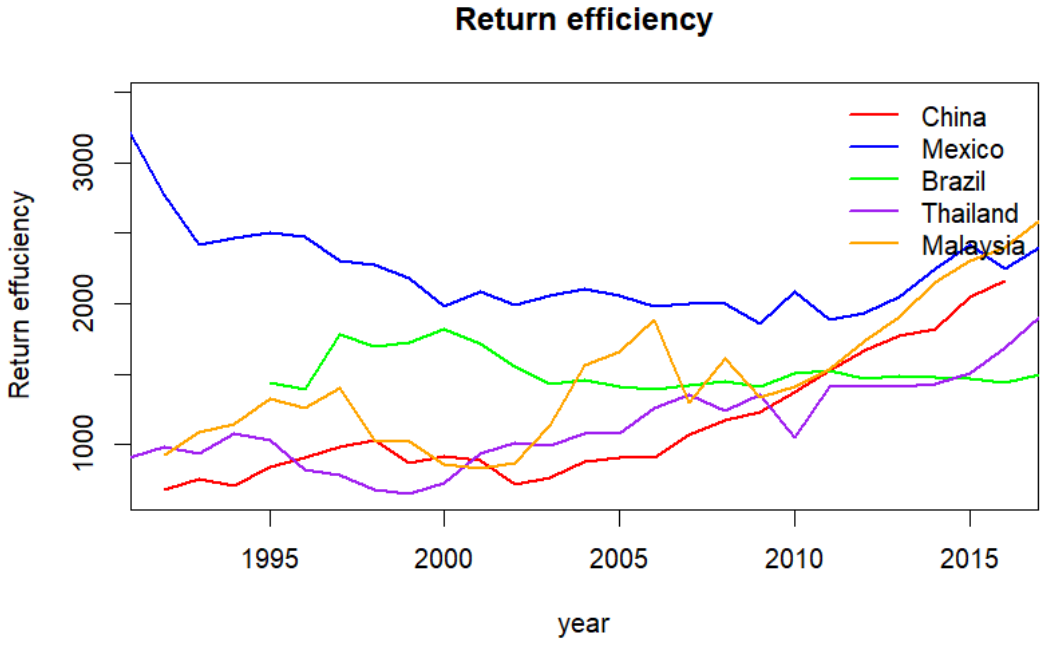

Fig. 3 Return efficiency

As illustrated in the Fig. 3, China demonstrates a pronounced and consistent upward trajectory in the return efficiency over the entire period. Malaysia also exhibits a clear increasing trend, with

notable acceleration after 2005. Both countries show sustained improvements in the efficiency of educational investment. Thailand and Mexico display moderate increases with intermittent fluctuations. Thailand's growth is gradual but perceptible, while Mexico's trend is more modest with periods of slower progress. Brazil shows relative stagnation throughout the period, with minimal variation in its rate of return to education. The trend remains largely flat, indicating little change in educational investment efficiency over the two decades. The consistently rising trends observed in China and Malaysia suggest effective approaches to educational investment that merit further examination. These patterns indicate potential valuable insights for policymakers seeking to enhance educational returns. Conversely, the stagnant trend observed in Brazil highlights challenges in translating educational investment into improved returns, suggesting aspects that may require fundamental reassessment.

3. Analysis

In order to understand why there is upward resistance to the return efficiency of educational investment in upper middle-income countries, this paper conducts research on the following three aspects.

3.1. Proportion of Educational Investment

This paper finds that the proportion of educational investment in primary, secondary and tertiary education varies greatly among different countries. Based on this, the following text analyzes the proportion of educational investment at different stages in the five target countries. This part mainly adopts the literature review method. Recent studies highlight persistent disparities in the allocation of educational resources across different stages of China's education system. Under a decentralized fiscal structure, funding for basic education remains heavily dependent on local government capacity, resulting in pronounced regional inequalities in per-student expenditure and educational quality at primary and secondary levels [2, 3]. Meanwhile, tertiary education continues to receive disproportionately large shares of central investment, reinforcing structural imbalances [4, 5, 6]. This differentiated funding pattern exacerbates urban–rural and interregional gaps, with secondary education—particularly vocational tracks—emerging as a systemic bottleneck. Such allocation mechanisms perpetuate inequities in both access and outcomes, constraining broader educational equity and efficiency [7, 8].

Recent studies emphasize that the allocation of public education spending across primary, secondary, and tertiary levels in Mexico and Brazil remains heavily skewed toward tertiary education, despite its regressive distributional effects. In Brazil, while expansionary policies increased tertiary access, the high per-student cost of universities continues to divert resources from foundational stages, exacerbating quality gaps in basic education [9, 10, 11]. Mexico exhibits similar trends, where tertiary institutions receive disproportionately larger subsidies relative to primary and secondary schools, limiting improvements in student retention and learning outcomes at critical lower levels. This misallocation perpetuates socioeconomic inequalities, as tertiary education largely benefits wealthier students. Current research calls for rebalancing strategies—such as conditional grants targeting disadvantaged regions and students—to prioritize equitable investment in primary and secondary education while exploring cost-sharing models for tertiary institutions [12, 13].

Recent studies note a clear contrast in educational expenditure allocation between Malaysia and Thailand. Thailand's spending remains heavily oriented toward primary education, but implementation inefficiencies and subnational disparities weaken its effectiveness, particularly at the secondary level [14, 15]. Malaysia employs a more balanced and strategically targeted distribution, strengthening secondary education while increasing tertiary investment to support economic objectives [16]. The investment of various countries at different educational stages can be summarized in the following table (Table 1):

Table 1. The investment of various countries at different educational stages

Countries	Primary education	Secondary education	Tertiary education	Reasons
China	Insufficient, large regional disparities	Insufficient, especially in vocational tracks	Over-invested	Fiscal decentralization leads to basic education relying on local capacity, while central funds excessively favor higher education, exacerbating urban–rural and regional imbalances.
Mexico	Under-invested	Under-invested	Over-invested	Public spending heavily skewed toward tertiary education, diverting resources from basic education, limiting improvements in retention and learning outcomes, and reinforcing inequality.
Brazil	Under-invested	Under-invested	Over-invested	Similar to Mexico; high per-student cost in universities diverts resources from basic education, affecting quality despite expanded tertiary access.
Thailand	Sufficient but inefficiently implemented	Low efficiency and significant subnational disparities	Relatively appropriate	Spending is oriented toward primary education, but implementation inefficiencies and regional gaps weaken outcomes, particularly at the secondary level.
Malaysia	Balanced and effective	Strengthened and effective	Increased and aligned with economic goals	Employs a balanced and strategically targeted distribution, simultaneously promoting basic and tertiary education to support economic development.

3.2. Human Resource Input

Government investment in education is allocated across multiple dimensions, such as teacher recruitment and school infrastructure construction. Among these, the most critical aspect—and fundamental to improving the return on educational investment—is the allocation toward teachers. The pupil-teacher ratio serves as an effective indicator of the adequacy of human resource input in education. A lower ratio generally implies that each student can receive more individualized attention from teachers.

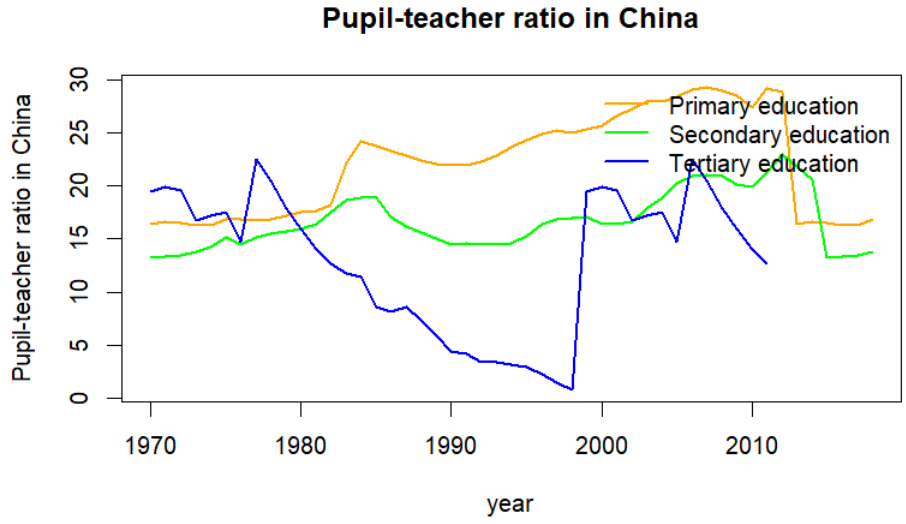

Fig. 4 Pupil-teacher ratio in China

In Fig. 4, the sharp increase in the pupil-teacher ratio of tertiary education in China in 1999 was caused by the expansion of college enrollment. Therefore, in the analysis, the changing pattern of the pupil-teacher ratio of tertiary education in other time periods should be focused on, rather than taking the increase in the student-teacher ratio of tertiary education in 1999 as some reason. It should be noted that the pupil-teacher ratio of tertiary education in China gradually declined after about 2007. After 2010, the pupil-teacher ratio in primary education and secondary education also dropped sharply one after another. This might all be the reason for the steady increase in the return efficiency of Chinese educational investment after 2005.

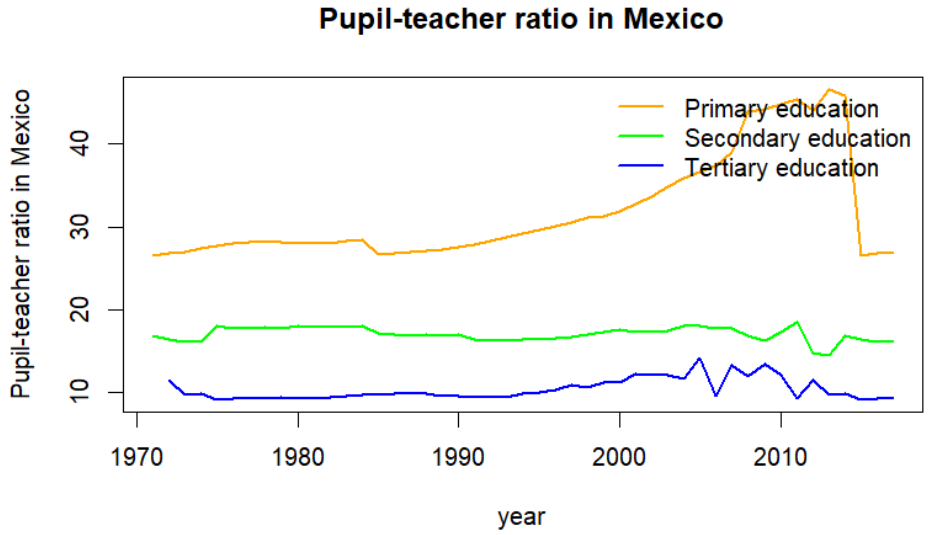

Fig. 5 Pupil-teacher ratio in Mexico

In Fig. 5, the pupil-teacher ratio in secondary and tertiary education in Mexico remained relatively stable within the time range included, while that in primary education gradually increased between 1990 and 2010. This might explain why the return efficiency of educational investment in Mexico gradually declined during this period.

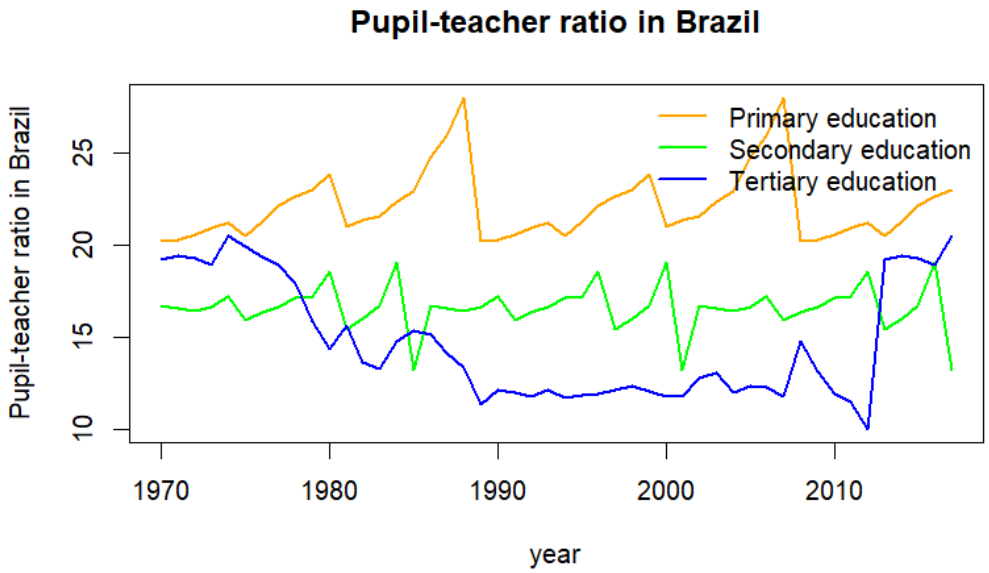

Fig. 6 Pupil-teacher ratio in Brazil

In Fig. 6, the pupil-teacher ratios in primary, secondary and tertiary education in Brazil have been fluctuating continuously within the included time range. Particularly, the pupil-teacher ratios in primary and secondary education have shown obvious cyclical fluctuation characteristics. Correspondingly, the return efficiency of Brazilian education has also been fluctuating slightly at a stable level. This matching further indicates the high correlation between the pupil-teacher ratio and return efficiency.

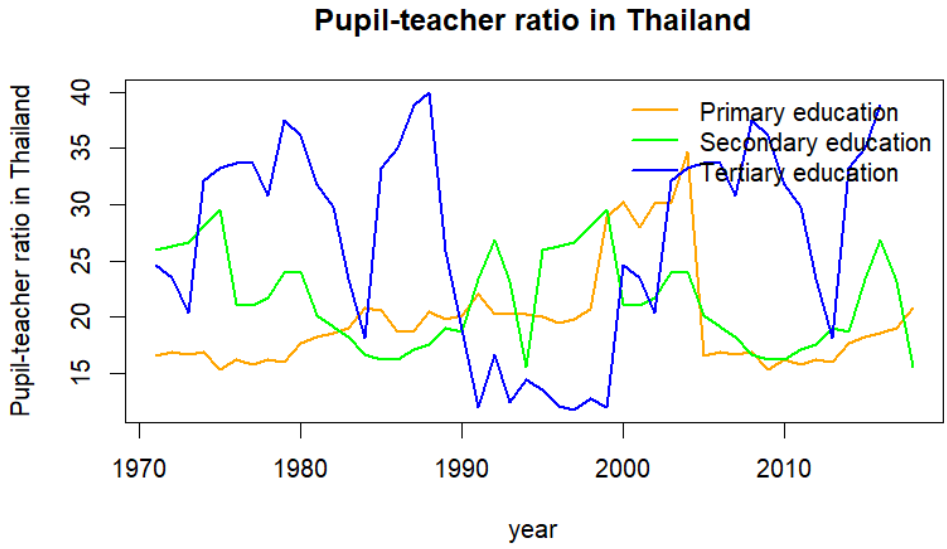

Fig. 7 Pupil-teacher ratio in Thailand

In Fig.7, the pupil-teacher ratio fluctuations at each stage of education in Thailand all show an irregularity, making it rather difficult to analyze its relationship with the return efficiency of educational investment in Thailand.

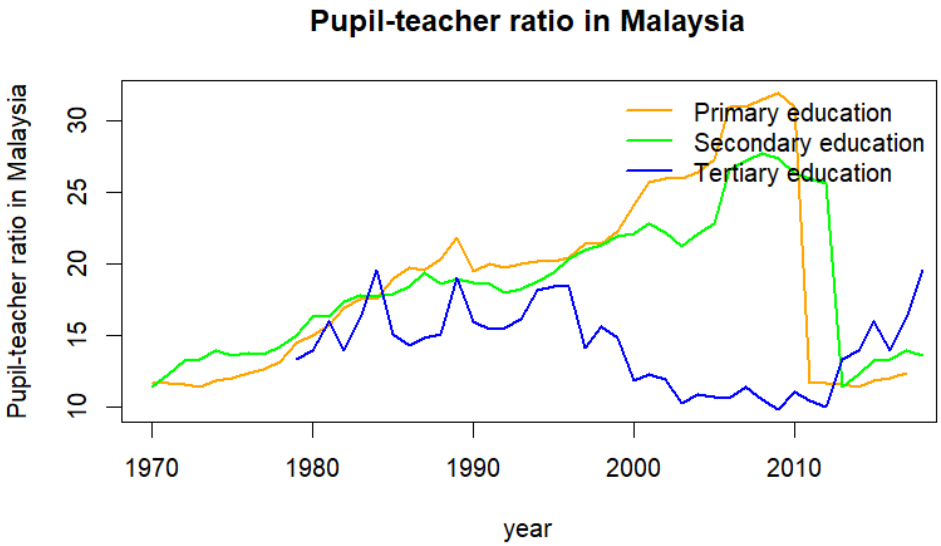

Fig. 8 Pupil-teacher ratio in Malaysia

In Fig. 8, the decline in the pupil-teacher ratio in tertiary education in Malaysia before 2005 might explain the increase in the return efficiency of Malaysian education before 2005. The sharp decline in the pupil-teacher ratio in primary and secondary education that occurred strongly around 2010 might explain the steady upward trend of the return efficiency of educational investment in Malaysia after 2010.

3.3. Matching Situation of Labor Market Demand

The alignment between education and the outcomes demanded by the labor market is a crucial reflection of educational effectiveness. This paper uses the unemployment rate as an indicator to capture this dimension. A lower unemployment rate may suggest a stronger match between the education system and labor market needs. However, the subsequent analysis will also take into account the lagged nature of this indicator—the alignment between education and the labor market is often reflected in the unemployment rate several years later.

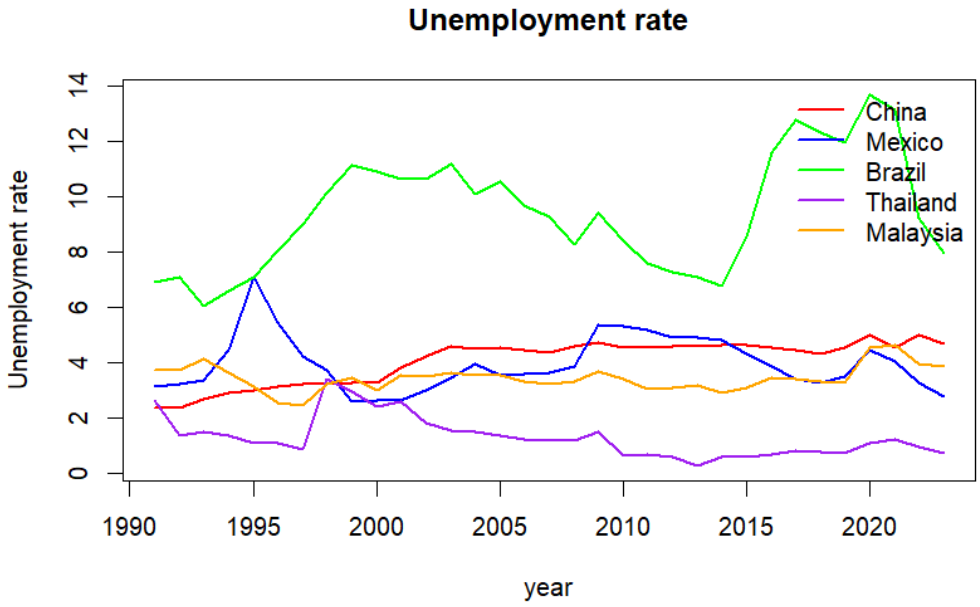

Fig. 9 Unemployment rate

As illustrated in Fig. 9, the unemployment rate in Mexico soared between 1993 and 1995, which indicates that the match between education and the demand of the labor market in Mexico was not high before that. This might explain why the return efficiency of education investment in Mexico decreased significantly before about 1993. Similarly, the unemployment rate in Thailand soared between 1997 and 1998, indicating that the match between education and the demand of the labor market in Thailand was not high before. This might explain the downward trend in the return efficiency of education investment in Thailand over the three years after 1995.

4. Solutions

Based on the above analysis of the reasons, the following three corresponding solutions can be summarized.

4.1. Enhance basic education funding

Apart from Malaysia, a common problem emerging in the upper middle-income countries under consideration is either insufficient investment in primary and secondary education (much lower than investment in tertiary education) or the investment not being effectively implemented (for example, although Thailand invests sufficient in primary education, the implementation effect is insufficient). The combination of primary education and secondary education constitutes basic education. Therefore, for upper middle-income countries, an effective measure to enhance the return efficiency of educational investment is to increase the proportion of investment in basic education and ensure through policies that the invested portion can be effectively converted into educational resources. A worthy example to learn from is Malaysia. In fact, Malaysia is simultaneously and evenly promoting investment in basic education and tertiary education.

4.2. Boost Teacher Resource Investment

In the previous reasons analysis, it can be found that the correlation between the pupil-teacher ratio and the return efficiency of educational input is extremely high in both primary, secondary and tertiary education. This indicates that an effective strategy to enhance the return efficiency of educational investment is to increase the proportion of educational input used for hiring teachers. In order to encourage more people to enter the education industry, it is also possible to consider strengthening the construction of normal universities and pre-service training institutions for teachers to increase the number of teachers entering basic education.

4.3. Aligning Curriculum with Labor Market Demand

In the analysis of the relationship between unemployment rate and the return efficiency of educational investment, the matching situation between education and the labor market will also have a significant impact on the return efficiency of educational investment. Therefore, one strategy to increase the return efficiency of education is aligning curriculum with labor market demand, with particular attention to curriculum design in tertiary education because tertiary education is the previous stage for students to enter the labor market.

5. Conclusion

Through the analysis of five representative countries, this paper finds that the hindering factors for the improvement of the return efficiency of educational investment in upper-middle-income countries are the imbalance of investment at different educational stages, the insufficient input of teacher resources, and the insufficient matching between education and the demand of the labor market. Therefore, three targeted solutions were respectively provided: enhancing basic education funding, boosting teacher resource investment, aligning curriculum with labor market demand. Through these three solutions, upper middle-income countries are expected to further enhance the return efficiency

of educational investment. In the long term, the realization of these measures requires not only financial adjustments but also institutional coordination among ministries of education, finance, and labor. Strengthening data-driven monitoring systems can help governments evaluate how effective investments translate into human capital outcomes. Moreover, international cooperation, especially through knowledge-sharing initiatives with higher-income economies, can provide valuable experience in teacher training and curriculum innovation. It is also important to recognize that educational investment efficiency is closely tied to broader social and economic reforms, such as poverty reduction, gender equality, and technological inclusion. Future research may expand this analysis by incorporating time-series data and micro-level evidence to further validate the causal mechanisms identified in this study. By integrating these perspectives, policymakers can develop more adaptive, evidence-based frameworks to ensure that education continues to serve as a sustainable driver of inclusive growth.

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