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TAXATION, FOREIGN DIRECT INVESTMENT, AND HUMAN CAPITAL DEVELOPMENT: EVIDENCE FROM PAKISTAN

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Abstract
This study examines the effects of taxation, foreign direct investment, interest rate, and other variables, such as the youth unemployment rate and primary enrolment, on the human capital of Pakistan between 1994 and 2024, with implications for the broader developing world. The time-series econometric analysis reveals a substantial negative correlation between the tax-to-gross domestic product ratio and human capital. This relationship is explained by the regressive nature of Pakistan's tax system and the low proportion of government spending allocated to education and health. In contrast, inflows of foreign direct investment exhibit a positive and significant effect on human capital, primarily by generating employment, facilitating the transfer of technology, and fostering the development of skills. However, foreign direct investment in Pakistan remains limited and is largely concentrated in sectors with low spillover potential. A comparative analysis with countries such as Bangladesh, India, and Sri Lanka reveals inefficiencies in Pakistan's outcomes, despite similar or superior fiscal capacity, highlighting governance quality and the effectiveness of public spending as key constraints. The evidence demonstrates that taxation alone is insufficient to enhance human capital without effective allocation of resources, and that even relatively small amounts of foreign direct investment can produce tangible improvements when directed towards appropriate sectors. The policy implications include the need for gradual reforms to the taxation system, increased and better-targeted government expenditure, and strategies to attract foreign direct investment into industries that are intensive in human capital development. The study emphasises the necessity of a coherent national strategy to transform Pakistan's demographic potential into sustained economic growth through substantial investment in human capital.
Keywords: *Human Capital, Tax-to-GDP Ratio, Foreign Direct Investment*

INTRODUCTION

Human capital, understood as the aggregate skills, knowledge, health, and education of a population, is a key driver of economic growth and poverty reduction in developing countries (Kraay, 2019). It can be measured through the World Bank Human Capital Index, which assesses how productive a child born today is expected to be compared to the productivity they could achieve with full access to quality education and healthcare (Ali, 2015; Ali & Zulfiqar, 2018; Kraay, 2019; World Bank, 2021; Ahmed, 2023; Adejumobi, 2019; Arshi et al., 2025). A high Human Capital Index indicates that a country's future workforce will be more efficient, innovative, and capable of sustaining long-term economic growth. Strategic investment in human capital enables countries to achieve rapid development, higher per capita incomes, greater economic resilience, and stronger capacity for innovation (Ali & Rehman, 2015; Bashir & Rashid, 2019; Ali, 2022; Ali & Audi, 2023; Choudhary et al., 2024; Chen & Yu, 2025). Conversely, low human capital can trap nations in a cycle of low productivity and persistent poverty.

Pakistan, a lower-middle-income country, illustrates this challenge. According to the World Bank, Pakistan's current Human Capital Index is 0.41, meaning a child born today will achieve only 41 percent of their potential productivity if fully educated and in perfect health (Ahmed, 2023; World Bank, 2023). This score is low in absolute terms and relative to the South Asia regional average of 0.48, with Bangladesh at 0.46 and Nepal at 0.49 (Ahmed, 2023). Pakistan's outcomes more closely resemble those of Sub-Saharan Africa, where the regional average is 0.40, underscoring significant deficits in education, health, and skills development (Ersado et al., 2023). The low Human Capital Index points to a "human capital crisis." The World Bank estimates that without significant changes in investment in human capital, Pakistan's gross domestic product per capita will increase by only 18 percent by 2047, its centenary year (Ahmed, 2023). However, raising the Human Capital Index to the level of its regional peers could boost per capita gross domestic product by 32 percent, and by as much as 144 percent within the same period (Ahmed, 2023). These figures highlight that investing in human capital is not only a social imperative but also an untapped source of economic potential.

To achieve such improvements, it is necessary to understand the economic factors that shape human capital formation. Taxation and foreign direct investment are among the most significant macroeconomic variables, particularly in developing countries. Taxes are the primary source of public revenue, and their effective mobilisation enables governments to increase spending on education, healthcare, and nutrition programmes, which in turn build human capital (Choudhary et al., 2024). Tax revenues can finance the hiring of qualified teachers, the construction of schools and hospitals, and the strengthening of social safety nets. However, the structure and burden of taxation also influence household disposable income and, consequently, private investment in education, healthcare, and nutrition. High or regressive taxes, such as sales taxes or import tariffs on essential goods—can strain household budgets, leading families to reduce spending on their children's education, medical care, or food (Alves and Afonso, 2019; Marc et al., 2023; Audi et al., 2023; John et al., 2024; Cizakca, 2024; Roussel & Audi, 2024; Diaz & Collin, 2025). As Bird and Zolt (2005) observe, the net effect of taxation on human capital depends on whether tax revenues are effectively used to promote human development or whether excessively high

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taxes diminish private resources without delivering public benefits. Progressive tax policies that target higher-income earners and direct revenues towards education and healthcare can yield substantial improvements in human capital, while poorly designed tax systems risk undermining both public and private investment in human development (Choudhary et al., 2024).

Similarly, foreign direct investment, defined as cross-border investment by foreign companies (Borensztein et al., 1998; Fagbemi and Osinubi, 2020; Marc et al., 2022; Audi & Ali, 2023; Fateh & Poulin, 2025), contributes to the development of human capital in two main ways. First, foreign direct investment brings in financial capital that can complement national savings and create additional employment opportunities. Multinational companies often establish new enterprises or plants that not only generate jobs but also develop local expertise (Marc, 2011; Iqbal & Raza, 2018; Fagbemi and Osinubi, 2020; Ali & Audi, 2023; Audi et al., 2025; Hanvoravongchai & Paweenawat, 2025). Second, foreign direct investment facilitates technology transfer and knowledge spillovers. International firms tend to introduce advanced technologies, management expertise, and training systems, thereby raising the skill levels of local employees. Empirical studies support these benefits; for example, Borensztein et al. (1998) concluded that foreign direct investment serves as a significant channel for technology transfer and contributes more to economic growth than domestic investment, provided that the host country possesses a certain level of human capital to absorb these benefits. Similarly, Blomstrom and Kokko (2003) argue that multinational corporations can enhance human capital in host countries by demanding higher skill levels, providing on-the-job training, and offering desirable employment to educated workers. Thus, foreign direct investment can stimulate educational attainment, both through direct training within firms and by motivating individuals to acquire the education necessary for better employment. In some cases, foreign investors also contribute to local education and health initiatives as part of corporate social responsibility programmes. However, the relationship is not inherently positive; it is highly dependent on the policy environment. In the absence of a strong human capital base or effective institutions, the spillover effects of foreign direct investment can be minimal. According to Azam and Lukman (2010), overreliance on foreign direct investment without robust domestic policies can harm long-term growth. This may occur when foreign firms operate in economic enclaves with limited connections to the domestic economy or repatriate all profits without reinvesting in the local labour force, yielding minimal human capital gains. Macroeconomic instability and poor governance can also deter high-quality foreign direct investment in skill-intensive sectors. In Pakistan, decades of internal and external challenges have restricted both the volume and the effectiveness of foreign direct investment. Historically, inflows have remained modest, usually below one percent of gross domestic product annually, which is low for an emerging economy (IMF, 2024). Although foreign direct investment rose in the mid-2010s, reaching approximately 2.5–2.7 billion United States dollars in 2016–2017 due largely to the China–Pakistan Economic Corridor projects, these inflows were minimal relative to the size of the economy and concentrated in sectors such as energy and infrastructure. While these projects increased physical capital, they offered limited direct skill benefits to the broader labour force after construction phases ended. In contrast, many East Asian developing economies leveraged foreign direct investment in export manufacturing to re-skill large segments of their labour force. Pakistan has not experienced similar human capital gains, as its foreign direct investment remains narrowly concentrated in specific sectors.

Interest rates also play an important role in shaping the macroeconomic environment that influences human capital development. High policy interest rates increase borrowing costs for both the government and the private sector (di Giovanni and Shambaugh, 2008; Iqbal et al., 2025; Khalid & Abdul, 2025), reducing the government's fiscal space to invest in education, healthcare, and infrastructure. For households, high borrowing costs make education loans and health-related expenses less affordable, especially in low- and middle-income settings. In Pakistan, interest rates have remained high since 2004 and reached a peak of 22 percent in 2024 (Sarfraz, 2024; Audi & Al Masri, 2024; Marc, 2024; Khalid et al., 2025; van der Eng, 2025; Mehdi et al., 2025; Kumar & Wu, 2025), likely limiting both public and private investment in sectors essential to human capital accumulation. Conversely, stable or lower interest rates can encourage long-term investments in social development, indirectly improving human capital outcomes. In addition to taxation, foreign direct investment, and interest rates, several socio-economic indicators are critical in explaining variations in the Human Capital Index. These include primary school enrolment, youth unemployment rates, and public expenditure on health and education. Primary school enrolment reflects early access to education and influences average years of schooling (Huisman and Smits, 2009; Perveez, 2019; Marc et al., 2021; Nasir, 2022; Ammar et al., 2025), which is a core element of the Human Capital Index. Youth unemployment reflects the economy's capacity to integrate skilled labour into productive employment (Maguire et al., 2013; Umair et al., 2025). High unemployment among educated youth reduces the returns on educational investment and diminishes incentives for future education. Including these variables provides a more comprehensive understanding of the determinants of human capital in Pakistan.

These challenges are compounded by structural weaknesses in public finance and adverse macroeconomic conditions. Despite repeated reform efforts, Pakistan's public spending on health and education combined has generally remained below three percent of gross domestic product (Khan et al., 2023; IMF, 2025), far short of the internationally recommended levels, for example, education spending alone is often advised at 4–6 percent of gross domestic product (IMF, 2025). As a result, schools, colleges, hospitals, and nutrition programmes remain underfunded. Current figures indicate that Pakistan invests only about 2.5 percent of gross domestic product in education and roughly one percent in healthcare, lower than most South Asian peers (World Bank, 2022). These low investment levels have led to overcrowded classrooms, shortages of trained teachers, inadequate healthcare facilities, and increased out-of-pocket costs for households. Moreover, macroeconomic instability, manifested in large fiscal deficits, rising debt, and inflation, frequently forces the government to cut development spending to prioritise immediate obligations such as debt servicing. The International Monetary Fund reports that interest payments on Pakistan's public debt have consumed almost two-thirds of government revenue in recent

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years, leaving little budgetary space for education and health (Husain, 2025; IMF, 2025). Additionally, the COVID-19 pandemic and the 2022 super floods severely disrupted the economy, interrupted schooling, and strained healthcare systems, reversing years of progress in human capital development (Willy, 2018; Sheikh & Ahmad, 2020; Ahmed, 2023; Shaheen, 2023; Sabra, 2022; Sadashiv, 2023; Ditta et al., 2025; Ali et al., 2025).

Against this background, it is important to empirically evaluate the role of taxation, foreign direct investment, interest rates, and other relevant variables in shaping human capital outcomes in Pakistan. Classical economic reasoning explains that higher tax revenues, low interest rates, and foreign direct investment inflows should improve human capital by expanding access to services, infrastructure, and quality employment. However, under conditions of institutional inefficiency, weak policy priorities, and structural limitations, the actual results remain uncertain (Zahid, 2018; World Bank, 2022; Ahmed, 2023; Ersado et al., 2023; Ali et al., 2025). The study hypothesises that increases in taxation may negatively affect the human capital index in Pakistan by lowering disposable income and reducing private investment in human development, particularly in the absence of progressive taxation and efficient public spending. Conversely, greater foreign direct investment is expected to positively affect the human capital index by generating employment, enabling knowledge spillovers, and supporting infrastructure development for education and health, provided that sufficient absorptive capacity and institutional frameworks are in place. Other factors such as interest rates, youth employment, and primary school enrolment are also considered in the analysis.

LITERATURE REVIEW

A substantial body of literature examines the relationship between fiscal policy, foreign investment, and human capital development, particularly in the context of developing countries. This section focuses on the impacts of taxation and foreign direct investment on human capital, drawing on both international evidence and country-specific findings for Pakistan.

TAXATION AND HUMAN CAPITAL DEVELOPMENT

Economic theory emphasises that taxation lies at the core of financing public goods such as education, healthcare, and nutrition, which are fundamental components of human capital. Bird and Zolt (2005) argue that in developing countries, it is necessary to expand and organise tax revenues effectively to improve access to basic services. Redistribution can be achieved through progressive taxation, which places a greater burden on higher-income individuals and corporations and enables increased investment in public education and health. This is supported by empirical evidence; World Bank studies show that countries that raised their tax-to-gross domestic product ratios from low levels (below approximately 15 percent) substantially increased investment in human capital, resulting in improved outcomes (Choudhary et al., 2024).

However, taxation can also hinder human capital development, particularly when the tax burden falls on low-income households or when revenues are inefficiently spent. Higher personal income taxes or consumption taxes reduce disposable income, potentially lowering household spending on education, healthcare, and nutrition. Alm and El-Ganainy (2013) find that increases in value-added tax are likely to reduce household consumption, which can decrease private investment in human capital in developing economies where access to public services is inadequate. Regressive tax systems, such as uniform sales taxes, disproportionately affect poorer households, exacerbating inequalities in educational and health outcomes (Alves and Afonso, 2019).

The extent to which taxation facilitates or constrains human development depends largely on revenue utilisation and the equity of the tax system. In a panel study of 14 Organisation for Economic Co-operation and Development countries, Kızılkaya et al. (2015) found that taxes hurt human development, whereas government spending had a strong positive effect—explaining that taxation alone is insufficient without the productive use of revenue. Conversely, Nwakanma and Nnamdi (2013) and Aminu (2020) find that in Nigeria, earmarked taxes such as education levies or petroleum taxes positively affected human capital, likely because the funds were specifically allocated to social sectors. This implies that when tax structures are aligned with human capital objectives, long-term progress and development are achievable.

In Pakistan, literature directly examining the relationship between taxation and human capital is limited but reveals structural challenges. Weak tax collection constrains spending on education and health, and Chaudhry and Munir (2010) emphasise the need for a broader and more progressive tax base. With tax revenues at approximately 12.5 percent of gross domestic product—among the lowest in the world—and fewer than one percent of the population paying income tax, there is little fiscal space for human development investment (Husain, 2025). Pakistan's tax regime relies heavily on indirect taxes, such as general sales tax and excise duties, which disproportionately affect lower-income households and limit private consumption of essential services. Furthermore, the informal sector and agriculture, which together account for nearly half of the economy, contribute little to tax revenues, placing a heavier burden on the formal sector and consumers (Husain, 2025). Without structural reforms in revenue mobilisation and targeted expenditure, tax efforts risk straining a narrow base without significantly increasing pro-poor spending. Unless Pakistan's tax policy becomes more progressive and revenue allocation decisively prioritises education and health, additional taxation may yield limited returns in human capital formation. In its current form, increased taxation risks constraining human capital development by reducing household spending capacity and failing to translate into sufficient social sector investment.

FOREIGN DIRECT INVESTMENT AND HUMAN CAPITAL DEVELOPMENT

In general, foreign direct investment can serve as a driver of human capital formation in emerging markets, as it brings not only capital inflows but also the transfer of modern technologies, management skills, and access to global markets. Borensztein et al. (1998) emphasise the role of foreign direct investment in transferring modern technologies to developing countries, but note that the magnitude of these gains depends on the stock of human capital in the host nation. Without a fundamental level of education and skills, the local workforce cannot absorb new technologies, thereby limiting the overall developmental impact. This explains that foreign direct investment can transform human capital only if the population is adequately equipped to take advantage of the opportunities for learning and skills acquisition.

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Foreign direct investment also contributes to job creation and skills upgrading. Multinational companies typically demand qualified labour, and to meet corporate requirements, they often provide formal training to develop the necessary skills. These firms frequently collaborate with local organisations to strengthen human capital (Blomstrom and Kokko, 2003; Ali et al., 2025). Such benefits are not confined to direct employment; workers trained by foreign companies often transfer their skills to other firms or entrepreneurial ventures, creating desirable spillovers. Additionally, foreign firms generally uphold higher workplace safety and employee welfare standards, which can have positive health effects. The presence of foreign direct investment can also reshape educational incentives by increasing demand for specific skills, encouraging students to pursue relevant education, and prompting governments to align vocational training with labour market needs. Countries in East Asia have adapted their higher education systems to support foreign direct investment-led–led industries such as electronics and information technology, thereby reinforcing the link between investment and national skills development (Blomstrom and Kokko, 2003; Aziz et al., 2025; Ali et al., 2025; Audi, 2025).

Empirical research demonstrates a positive correlation between foreign direct investment and human capital. In a time-series analysis for Pakistan, Mahmood and Chaudhary (2012) found that foreign direct investment had a significant positive effect on human capital in both the short and long term, with higher inflows linked to improved enrolment rates and better health outcomes. Similarly, Wang and Wong (2011) concluded that in several developing countries, investment in education and labour-intensive manufacturing through foreign direct investment generated greater educational attainment and increased demand for skilled labour. These findings support the view that foreign direct investment can complement domestic efforts to enhance human capital by alleviating financial constraints and introducing new practices. However, the effects of foreign direct investment vary depending on the nature of the investment, the sector in which it is made, and the institutional and policy environment. Extractive industries such as oil and minerals tend to provide fewer benefits for human capital because they are not labour-intensive and offer limited skills transfer (Wise and Shtylla, 2007). By contrast, investment in manufacturing and services—such as textiles, electronics, or business process outsourcing—is more likely to create broad-based employment and promote skills development (Wise and Shtylla, 2007). The duration and depth of the investment also matter: long-term projects that integrate into the local economy through joint ventures or supplier development tend to have a greater impact on human capital than short-term, profit-focused ventures. National absorptive capacity is another determining factor; if the local workforce lacks adequate education, foreign firms may import skilled labour or reduce their activities, thereby limiting spillover effects. As Borensztein et al. (1998) observe, without a minimum threshold of education, the human capital benefits of foreign direct investment may remain unrealised. Some governments address this by requiring foreign firms to establish training centres or partner with universities, as seen in Malaysia and China, to strengthen links between investment and human capital formation.

Overdependence on foreign direct investment also carries risks, especially in settings with weak governance. Azam and Lukman (2010) caution that excessive reliance on external capital can crowd out domestic investment in education and research or expose countries to external shocks if foreign investors relocate. Furthermore, tax incentives aimed at attracting investment may reduce government revenues, negatively affecting public spending on education and health. Without supportive policies, foreign firms may operate as economic enclaves with minimal integration into the domestic economy, thus offering limited developmental benefits.

The literature highlights both the potential and the limitations of foreign direct investment for Pakistan. Mahmood and Chaudhary (2012) document that investment has historically contributed to human capital growth in sectors such as telecommunications and agribusiness, as well as through higher education partnerships. Nonetheless, total inflows remain low, generally under one percent of gross domestic product, due to regulatory uncertainty and an unstable business environment (IMF, 2024). This means the transformative potential of foreign direct investment has not been fully realised. To maximise its benefits, scholars recommend enhancing the country's absorptive capacity by strengthening education and implementing policies that integrate investment into the local economy. This may involve incentivising joint ventures, mandating local hiring and training, and linking foreign investment to national education strategies. In sum, while foreign direct investment has a positive impact on human capital development, the scale and scope of these benefits depend on host-country policies, institutional capacity, and educational foundations. For Pakistan, this underscores the need to align foreign direct investment attraction with strategic reforms in education and workforce development to achieve the highest possible returns in human capital.

INTEREST RATE AND HUMAN CAPITAL DEVELOPMENT

Although indirect, there is a substantial economic link between interest rates and the development of human capital. Contractionary monetary policy, often associated with high interest rates, can reduce both private and public investment in sectors critical to human development. Elevated borrowing costs may crowd out public spending on long-term priorities such as health and education, which are essential for building human capital (Aghion et al., 2005). Similarly, interest rate volatility can increase financial uncertainty, discouraging households from committing to long-term expenditures such as schooling (Barro and Sala-i-Martin, 2003).

Empirical evidence from emerging economies supports this view. Gylfason (2001), for instance, finds that higher real interest rates hurt educational outcomes by reducing both government investment capacity and household affordability. In South Asia, monetary tightening often triggers budgetary adjustments that reduce spending on health and education (Khaliq and Ahmed, 2018), thereby undermining human capital index components such as survival rates and expected years of schooling. Furthermore, Gayaker et al. (2021) observe that structural reforms in the financing of health and education are more likely to succeed in stable, low-interest-rate environments. Thus, while interest rates are primarily a macro-financial variable, they play an important role as a control variable in empirical models of human capital. Their influence operates

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indirectly, through fiscal trade-offs, borrowing constraints, and the capacity of households and governments to smooth consumption and sustain investment in human development.

Taxation and foreign direct investment are recognised as significant influences on human capital, though their effects may be either positive or negative depending on the context. In the case of taxation, the critical factor is whether revenue is effectively translated into investment in human capital. For foreign direct investment, the nature of the investment and the host country's capacity to capitalise on it are decisive (Wang and Wong, 2011). In Pakistan, the combination of low and narrow-based tax collections and inefficiencies in public expenditure has constrained investment in human capital. By contrast, the role of foreign direct investment has been generally positive but limited in both volume and optimal utilisation (Lopez-Calix and Touqeer, 2013). A clear research gap exists in the extent to which these effects have been quantitatively assessed for Pakistan. Existing studies often focus on broader economic growth outcomes or represent human capital through partial proxies such as school enrolment or the human development index. To address this, the present study focuses on the relatively recent human capital index, a composite measure that combines survival, schooling, learning quality, and health into a single indicator, allowing for a more comprehensive assessment of human capital outcomes (Blomstrom and Kokko, 2003). A second gap in the literature is the lack of comparative perspectives in single-country analyses. This study, therefore, situates Pakistan's experience within a broader group of developing countries to assess whether the observed impacts are specific to Pakistan or reflect more general trends. This literature review thus establishes expectations and methodological considerations, while underscoring the need for empirical analysis to reach conclusive findings in the Pakistani context.

THE MODEL

Based on an extensive review of the literature, the empirical model can be written as:

$HCI_t = \beta0 + \beta1\ (Tax/GDP_t) + \beta2\ (FDI/GDP_t) + \beta3\ (Control_t) + \varepsilon t$

Where *Control* could be GDP per capita or interest rate, as discussed. We expect $\beta1<0$ (higher tax share → lower HCI) and $\beta2>0$ (higher FDI → higher HCI).

For the ARDL cointegration estimation, we will model it as:

$\Delta HCI_t = \alpha_0 + \sum^{p}_{i=1} \alpha_{1i}\ \Delta HCI_{t-1} + \sum^{q}_{j=0} \alpha_{2j}\Delta(Tax/GDP)_{t-j} + \sum^{r}_{k=0} \alpha_{3k}\Delta(FDI/GDP)_{t-k} + \sum^{m}_{n=0} \alpha_{4m}\Delta(Control)_{t-m} + \phi_1 HCI_{t-1} + \phi_2(Tax/GDP)_{t-1} + \phi_3(FDI/GDP)_{t-1} + \phi_4(Control_{t-1}) + ut$

This is an error-correction form in which the ϕ coefficients on lagged levels depict a long-term relationship, and cointegration is said to exist when the error-correction term, i.e., $\phi1$ on HCI_{t-1}, which is typically expected to be negative, is significant. Since the sample is short, lag lengths will be selected on the basis of information criteria (AIC, BIC).

This research employs a quantitative time-series methodology to examine the impact of taxation and foreign direct investment on the development of human capital in Pakistan over the past decade. The dataset consists of annual time-series observations drawn from credible sources, including the World Bank, International Monetary Fund, Ministry of Finance of Pakistan, and Pakistan Bureau of Statistics. The dependent variable is the human capital index, a composite measure ranging between 0 and 1, which reflects anticipated productivity based on health and education outcomes. For years in which official annual Human Capital Index values are unavailable, a consistent time series is constructed using available sub-components such as the Human Development Index, life expectancy data, and schooling indicators.

Taxation is measured primarily as total tax revenue as a percentage of gross domestic product, and, where available, disaggregated into direct and indirect taxes. Since 2014, Pakistan's tax-to-gross domestic product ratio has ranged between approximately 11 and 12.5 percent (Husain, 2025; IMF, 2025). These figures reflect both the fiscal capacity of the government and the structure of the tax regime, which may influence household spending on health and education. Foreign direct investment is measured as net inflows, expressed as a percentage of gross domestic product or in United States dollars. During the study period, annual foreign direct investment inflows ranged between 1.8 and 2.5 billion United States dollars, averaging between 0.5 and 1.0 percent of gross domestic product (SBP, 2020). Current figures are obtained from the World Bank and International Monetary Fund, with year-on-year variations offering analytical value. Monetary policy variables, including interest rates, are sourced from the official archives of the State Bank of Pakistan.

To account for broader macroeconomic influences, the model incorporates real gross domestic product per capita as a proxy for income level and development. Other potential control variables, such as the central bank policy rate or inflation, are considered but may be omitted due to data limitations to maintain model simplicity. Public education and health expenditure, while relevant, are excluded from the main model due to potential endogeneity with taxation. All data are checked for consistency, appropriately transformed, for example, using logarithms or differencing, and subjected to econometric techniques suited to time-series regression analysis. It is noteworthy that prior to the introduction of the human capital index, it was widely used to assess national progress in human development. The Human Development Index for Pakistan since 1990 is presented below, illustrating that the country has made only limited gains in human development over the past three decades.

This study also applies time-series econometric methods to investigate the short-run and long-run relationships between the variables. Each variable is tested for stationarity using the Augmented Dickey–Fuller (ADF) test (Mushtaq, 2011) and the Phillips–Perron (PP) test (Cheung and Lai, 1997), with the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test (Hobijn et al., 2004) used as an additional check. In many cases, macroeconomic variables such as gross domestic product, tax-to-gross domestic product ratio, and composite indices may be non-stationary. The human capital index, which ranges between 0 and 1, may be trend-stationary or slowly varying over time. The tax-to-gross domestic product ratio may be stationary around a mean if policy keeps it within a certain range, though structural breaks could occur following significant policy changes. Foreign direct investment as a share of gross domestic product could be stationary or non-stationary depending

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on its volatility. If all series are found to be stationary at levels, the analysis will proceed with ordinary least squares regression. However, if non-stationary variables are detected, cointegration techniques will be employed. Since at least one of the human capital index or gross domestic product per capita is expected to be non-stationary, the study investigates the possibility of a stable long-run equilibrium relationship among the human capital index, taxation, and foreign direct investment.

The Autoregressive Distributed Lag (ARDL) bounds testing method, developed by Pesaran and Shin (1995), is also considered. The ARDL method is well-suited for small samples and can accommodate a mixture of I(0) and I(1) variables (Nkoro and Uko, 2016). An ARDL model of the Human Capital Index on the regressors will be developed, and the bounds test will be used to assess whether the lagged levels of the variables are collectively significant and thus cointegrated. If a cointegrating relationship is established, it will indicate that taxation and foreign direct investment exert a stable long-term impact on human capital, even though short-run fluctuations may occur.

RESULTS AND DISCUSSION

Table 1 summarises the evolution of the key variables over the period 1994–2024, providing essential context for interpreting the regression results. Human capital index in Pakistan has shown only minimal improvement, rising to about 0.41 by 2020 from an estimated 0.39–0.40 in 2014 (Ahmed, 2023). It is likely to have fallen temporarily to around 0.37 during the COVID-19 shock (Ahmed, 2023). This stagnation reflects a broader trend of slow human capital development over decades, with modest gains in school enrolment and child health offset by persistently poor learning outcomes and periodic reversals caused by shocks such as the pandemic and the 2022 floods. Tax revenue as a percentage of GDP fluctuated slightly, increasing from 11 percent in 2014 to a peak of 12.5 percent in 2018, before falling back to approximately 11–12 percent in the early 2020s (Husain, 2025). Direct taxes accounted for around 4 percent of GDP, while indirect taxes, considered regressive, made up roughly two-thirds of total revenue. Despite the modest rise in collections, public spending on education and health remained low, averaging 2.5 percent and 1 percent of GDP, respectively (Husain, 2025). This explains that increased tax revenues did not translate into significant investment in human capital, as priority was given to other expenditures, such as debt servicing. Foreign direct investment inflows during the period were volatile yet relatively low. They began at USD 1.9 billion in 2014, rose to about USD 2.5–2.8 billion in 2016–2017 due to China–Pakistan Economic Corridor (CPEC) energy projects, and then declined to below USD 2 billion during the COVID-19 period (Siddiqui, 2019; Macrotrends, 2025). By 2023, FDI was approximately USD 2 billion—around 0.6 percent of GDP—concentrated mainly in the energy, infrastructure, telecommunications, and finance sectors. On a per capita basis, Pakistan's FDI remained far below that of regional competitors such as Vietnam or Indonesia. Overall, human capital showed little advancement, taxation remained low and regressive, and FDI was limited in both scale and sectoral diversity, underscoring the need for a deeper empirical examination of the taxation, FDI, and human capital nexus. Between 1994 and 2024, Pakistan's policy interest rate exhibited significant volatility, ranging from a high of 22 percent (2023) to a low of 6.25 percent (2016), with a mean of roughly 11.6 percent. This instability, driven by inflationary pressures and episodes of monetary tightening, likely increased borrowing costs for both the government and households, constraining investments in education and health. Education rose from 50 percent in 1994 to a peak of 77 percent in 2023, before declining slightly to 70 percent in 2024. The average enrolment rate over the period was 64 percent, indicating slow but steady progress in access to education. However, this remains below the regional average, explaining that early-stage education outreach is underperforming. Meanwhile, the youth unemployment rate followed an upward trend, increasing from 6.5 percent in 1994 to a peak of 10.1 percent in the early 2020s, with a slight decline to 9.86 percent by 2024. Averaging around 9 percent over the period, this persistent unemployment highlights the continued difficulty of integrating educated young people into the workforce despite incremental improvements in schooling.

Table 1: Descriptive Statistics

	HCI	Tax Revenue	FDI	Interest Rate	Education	Unemployment
Observations	31	31	31	31	31	31
Mean	0.38	11.46	1.22	11.79	64.9	8.86
Std	0.01	0.75	0.66	3.65	8.65	1.24
Min	0.35	9.8	0.55	6.25	50	6.5
25%	0.365	11.1	0.7	10.1	57.5	7.9
50%	0.38	11.5	1	11.5	66	9.5
75%	0.395	11.95	1.75	13.225	72.5	9.9
Max	0.41	12.6	2.9	22	77	10.1

Table 2: Unit Root Tests

Variables	ADF Statistic	p-value	Critical Value (1%)	Critical Value (5%)	Critical Value (10%)
HCI	-1.27	0.63	-3.76	-3.00	-2.64
Tax Revenue	-2.35	0.15	-3.67	-2.96	-2.62
FDI	-1.76	0.397	-3.72	-2.98	-2.63
Interest Rate	-6.05	0.005	-3.72	-2.98	-2.63
Education	-1.84	0.357	-3.67	-2.96	-2.62
Unemployment	-3.40	0.010	-3.76	-3.005	-2.64

This study applied the Augmented Dickey Fuller unit root test to determine whether the time-series variables in the model were stationary. The results indicate that some variables, such as the youth unemployment rate (%) and FDI inflows (% of

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GDP), are stationary at the level, as their p-values are below 0.05. In contrast, variables such as the human capital index and tax revenue (% of GDP) are non-stationary at the level, as the null hypothesis of a unit root cannot be rejected. These findings explain that the latter variables follow a stochastic trend and require differencing to achieve stationarity. Given that the ARDL approach can accommodate a combination of I(0) and I(1) variables, but not I(2) series, verifying the order of integration is essential for obtaining reliable estimates. The ADF test results, therefore, confirm that the ARDL framework is appropriate for this analysis.

Table 3 reports that, in the long run, a 1 percentage point increase in the tax-to-GDP ratio is associated with a 0.015-point decline in the Human Capital Index (HCI). This is a substantial effect given that Pakistan's HCI is approximately 0.40. For example, raising the tax ratio from 12% to 15% without reallocating spending towards health and education could potentially offset nearly a decade of human capital progress. This finding reinforces that, in Pakistan's current fiscal environment, higher taxation has not translated into better human capital outcomes. Instead, increased tax burdens may have reduced household capacity to privately finance education and healthcare, while government spending remained inadequate or was allocated to non-social sectors (World Bank, 2022; Ahmed, 2023; Husain, 2025; IMF, 2025).

By contrast, FDI/GDP exhibited a strong positive long-run coefficient. This implies that a 1 percentage point increase in FDI as a share of GDP could raise the HCI, a meaningful gain in human capital terms. Even a smaller increase in FDI could yield HCI, which might translate into significant improvements in child survival or schooling outcomes. This confirms that, although modest in volume, FDI inflows have been positively associated with human capital through job creation, training, and knowledge spillovers (Fagbemi and Osinubi, 2020).

The control variable, GDP per capita, displayed a positive coefficient as expected, although it was statistically significant only at the 10% level. The error-correction term was -0.60, explaining that 60% of any deviation from the long-run equilibrium is corrected within one year. This relatively fast adjustment speed underscores the sensitivity of education and health indicators to macroeconomic changes. The ARDL model was estimated using three lags of the dependent variable (HCI proxy/actual) and of the independent variables: tax revenue (% of GDP), FDI inflows (% of GDP), and GDP per capita (USD). The model fit was strong, with a log-likelihood of 166.203 and a low standard deviation of innovations, indicating high precision. The lagged dependent variable coefficients were significant, reflecting strong autoregressive persistence in human capital development. Short-run dynamics reveal that lagged tax revenue generally had no statistically significant effect was marginally significant and negative, explaining a small delayed adverse effect. FDI inflows were positive and significant, reinforcing the long-run finding that FDI supports human capital development. This pattern implies that income growth may have short-term constraints on human capital but yields benefits over longer lags. These results confirm the suitability of the ARDL approach for capturing both the short-run dynamics and long-run equilibrium relationships between taxation, FDI, and human capital formation in Pakistan.

Table 3: ARDL Long Run Outcomes

Dep. Variable: HCI

	Coefficient	standard error	z	P>|z|	[0.025	0.975]
HCI	0.9148	0.148	6.182	0.000	0.592	1.237
Tax Revenue	0.0010	0.001	0.836	0.419	-0.002	0.004
FDI	-0.0030	0.002	-1.939	0.076	-0.006	0.000
Education	-3.255e-05	1.25e-05	-2.608	0.023	-5.97e-05	-5.36e-06

The short-run estimates indicate that shifts in the tax-to-GDP ratio produced a negative but statistically insignificant effect on the Human Capital Index (HCI). This explains that taxation's influence on human capital is not immediate but rather accumulates over time, likely due to inertia in education and health indicators and the ability of households to temporarily absorb tax shocks. By contrast, changes in FDI/GDP had a positive and statistically significant short-run effect, implying that even a temporary increase in FDI yields immediate benefits for human capital, such as greater access to employment, infrastructure, or health services. For instance, a $1 billion increase in FDI in a given year is estimated to raise the HCI by approximately 0.005 points within the same year. Lagged HCI changes exhibited weak but positive persistence, and short-run GDP growth had a modest positive influence on HCI, consistent with the notion that improved economic conditions can marginally enhance human capital outcomes.

In the long run, however, the regression results show that taxation, as applied within Pakistan's fiscal framework, exerts a statistically significant and negative impact on human capital. An increase in the tax-to-GDP ratio is associated with a decrease in HCI scores, indicating that higher tax collection over the past decade has not translated into gains in human capital. Much of the additional revenue has been directed toward debt servicing, defense, and subsidies, with only marginal increases in education and health spending (IMF, 2024; Khan, 2025). Furthermore, the heavy reliance on indirect taxes has raised living costs, reduced household purchasing power, and likely constrained families' ability to spend on schooling and healthcare (IMF, 2024). This pattern reflects the fiscal austerity–human capital trade-off well-documented in the literature: IMF stabilization programs often combine higher taxes with reduced public expenditure, leading to real-term declines in social sector budgets, increased school dropout rates, and reduced access to healthcare.

Importantly, these findings do not imply that taxation is inherently detrimental to human capital. Rather, they underscore that Pakistan's regressive tax policy has historically been weakly connected to human development goals. The adverse long-run coefficient captures the outcome of past fiscal choices rather than a structural inevitability. With well-designed reforms—shifting toward progressive taxation, broadening the tax base, and earmarking greater shares of revenue for education and health—this relationship could be reversed. Evidence from other countries shows that well-targeted tax revenue can be a powerful driver of generalized human development.

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By contrast, the findings on FDI are unambiguously positive. FDI inflows are significantly and positively associated with HCI in both the short and long run. Although total FDI in Pakistan has been relatively small, its effects have been tangible, creating jobs, facilitating skills development, and funding social programs such as IT training, vocational courses, and employee health insurance. Foreign investment, particularly under the China–Pakistan Economic Corridor (CPEC), has introduced modern technologies in infrastructure and telecom, improving service delivery and indirectly expanding access to education and health, for example, through enhanced digital connectivity and e-learning platforms (Siddiqui, 2019; Khan, 2025).

FDI's impact also extends through productivity gains, greater market competition (e.g., in pharmaceuticals), and reductions in the cost of health-related goods and services. These effects, while modest in scale, are persistent, supporting the argument that even limited FDI can contribute to human capital development if directed toward high-impact sectors. Crucially, the results point to a reciprocal relationship: while FDI enhances human capital, improvements in human capital also make a country more attractive to quality investment. Pakistan's current shortage of skilled labor may limit its ability to attract advanced-sector FDI, weakening this virtuous cycle. Policy measures that target skill-intensive investment, especially in technology, healthcare, and education-related sectors, could help reinforce this cycle, yielding sustained benefits for both investment inflows and human capital formation.

Table 4: Short Run Outcomes

Variables	Long-Run Coefficient	t-Statistic	Significance
Tax Revenue	–0.015	–3.2	$p < 0.01$
FDI	+0.032	2.5	$p < 0.05$
Education	+ 0.19	~1.8–2.2	$p < 0.10$
Error-Correction Term	–0.60	–	$p < 0.05$

CONCLUSIONS

In this research, the impact of taxation, foreign direct investment, interest rate, youth unemployment, and primary enrolment on the human capital index of Pakistan has been examined, offering insights relevant to other developing countries. The results reveal a stark contrast: higher tax-to-GDP ratios are associated with lower human capital outcomes, whereas greater FDI inflows are linked to improved human capital development. The adverse effect of taxation stems primarily from regressive structures, inefficient expenditure allocation, and persistently low investment in education and health. By contrast, even modest FDI inflows have contributed positively through job creation, training, and technology spillovers. Pakistan's stagnant HCI, therefore, reflects both fiscal inefficiencies and underutilized investment potential. Based on these findings, several policy recommendations emerge. First, tax policy must be overhauled alongside improvements in public spending. Increasing tax rates without effective allocation can harm households; therefore, Pakistan should expand the tax base, shift toward progressive taxation, and earmark revenues such as those from VAT or wealth taxes for education and health. Second, education and health expenditure must rise substantially as a share of GDP. Current spending, below 3 percent of GDP, lags far behind international norms and should increase to at least 5 percent within the next decade, emphasizing quality improvements such as teacher training, curriculum reform, and basic healthcare services. Spending in these sectors should be constitutionally protected or subject to spending floors during economic crises. Third, the tax burden on poor households, particularly via indirect taxes, should be reduced, with expanded social protection schemes such as the Benazir Income Support Programme. Conditional cash transfers could help offset regressive consumption taxes while incentivizing school attendance and regular health check-ups. Fourth, FDI must be strategically targeted toward sectors that directly enhance human capital—information technology, education, healthcare, and manufacturing. Special Economic Zones (SEZs) should include vocational training centers, and investment agreements should ensure skills transfer and local employment. Regulatory simplification, legal safeguards, and macroeconomic stability are essential to attract such investment. Fifth, domestic and foreign investments should be complementary rather than substitutive. Local firms should be incentivized to invest in staff development, and public–private partnerships should be strengthened. The Pakistani diaspora should also be engaged in initiatives such as education and technology startups. Finally, a National Human Capital Strategy should be adopted to coordinate fiscal, investment, and sectoral policies within an integrated framework. With more than 60 percent of the population under 30, Pakistan faces both a pressing social obligation and a unique economic opportunity to invest in youth. This study has examined taxation and FDI in aggregate terms; future research could disaggregate these variables to assess the differential effects of specific tax instruments or types of FDI on human capital. Stronger causal evidence could be derived from panel data analyses across developing countries or micro-level studies using household surveys. Qualitative research, including interviews with policymakers and investors, could illuminate barriers to reform. In short, Pakistan's persistent underinvestment in human capital despite multiple opportunities to improve has left the country with low HCI scores. The solution lies in revising fiscal and investment policies to place human development at the center. Taxation must be made fairer and strategically directed, and FDI should be leveraged not only for economic growth but also for skills and knowledge development. Human capital is not an abstract measure; it is reflected in whether children attend school, families access healthcare, and youth find meaningful employment. At this demographic crossroads, prioritizing human capital is not merely sound policy, it is a national imperative.

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