

FROM YOUTH BULGE TO DEMOGRAPHIC DIVIDEND: A QUANTITATIVE ASSESSMENT OF PAKISTAN'S YOUTH POTENTIAL FOR NATIONAL DEVELOPMENT

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Abstract

Pakistan's seventh Population and Housing Census, conducted in 2023 as the country's first digital enumeration, counted 241.5 million people and confirmed one of the youngest populations in Asia, with a median age of about twenty years and nearly two in three residents below the age of thirty. This article asks a straightforward but consequential question: will that youthful population become an economic asset, in the form of a demographic dividend, or will it remain a source of strain? Working entirely from official Pakistan Bureau of Statistics figures, namely the 2023 Census and the Labour Force Survey 2020–21, and setting them against seven decades of earlier census returns, we measure the size and geography of the youth cohort, trace the movement of the total, youth and old-age dependency ratios, date the dividend 'window of opportunity', and use a support-ratio accounting framework to gauge how large the first dividend might be under different policy paths. The population has grown more than sevenfold since 1951, and the working-age share has climbed from roughly 52 to 54 per cent in the 1980s to about 60 per cent in 2023, with a projected peak near 65 per cent around 2045. The opportunity is therefore real, but it is also finite and already partly spent. It is also strikingly uneven across space: a youth literacy rate near 72 per cent, secondary enrolment below 44 per cent, and a youth NEET rate of about 37 per cent, rising above half among young women, are compounded by deep provincial divides, with more than half of Balochistan's children out of school against fewer than one in six in Islamabad. Our scenario accounting suggests that closing the human-capital and gender gaps could roughly quadruple the per-capita income gain available before the window closes. Pakistan's demographic moment is genuine, but capturing it will require prompt, spatially targeted and gender-responsive investment in schooling, skills, health and jobs.

1. Introduction

Few relationships in development economics are as well established as the link between a population's age structure and its economic fortunes. When mortality falls and, some years later, fertility begins to decline, the age pyramid passes through a distinctive phase in which the working ages swell relative to the young and the old. For a few decades the number of potential producers grows faster than the number of dependent consumers, and this creates what economists call a demographic dividend: a window in which a favorable age structure can lift output per head, raise savings and deepen investment, provided the right policies are in place (Bloom and Williamson, 1998; Bloom, Canning and Sevilla, 2003). The rapid growth of the East Asian economies between the 1960s and the 1990s is the textbook case, and demographers have attributed as much as a third of that growth to the shifting balance of ages alone.

Pakistan has now arrived at the threshold of such a transition. Its seventh Population and Housing Census, carried out in 2023 and notable as the country's first fully digital count, recorded a national population of 241,499,431 and reaffirmed Pakistan's position as the fifth most populous country on earth (Pakistan Bureau of Statistics [PBS], 2023). More telling than the headline total is the shape of the population behind it. The median Pakistani is only about twenty years old; close to 64 per cent of the population is under thirty; and roughly 29 per cent falls within the 15–29 band that national policy treats as 'youth' (UNFPA Pakistan, 2024). In sheer numbers this is the largest generation of young people the country has ever had, and, because fertility is still comparatively high, it will keep growing for another quarter-century (UNFPA Pakistan, 2016).

A large youth cohort, however, guarantees nothing. Young people become an economic asset only insofar as they are healthy, schooled, skilled and, above all, employed. Where those conditions are missing, the same demographic weight can deepen unemployment, overburden public services and heighten social and political

tension, and a substantial literature links unabsorbed youth bulges to elevated risks of unrest and conflict (Urdal, 2006; Cincotta, Engelman and Anastasion, 2003; Lin, 2012; Nayab, 2008). These stakes are all the sharper for a country whose geo-strategic position is at the crossroads of South, Central and West Asia (Abbas et al., 2024). Pakistan's current indicators leave little room for complacency. The 2023 Census puts overall literacy at just 60.65 per cent, and the Labour Force Survey 2020–21 finds that about 37 per cent of young people aged 15–29, some 21.8 million individuals, are neither in education nor in employment nor in training, a figure that climbs well above half among young women (PBS, 2022a). The policy question is therefore not whether Pakistan has a youth bulge, which it plainly does, but whether it can convert that bulge into a dividend, how much time remains to do so, and what it would take to succeed.

This article addresses those questions through a quantitative, census-anchored, and deliberately geographical lens. We make three contributions. First, we use the 2023 Census, the most reliable enumeration of the country's age structure to date, to measure the size and composition of the youth cohort, and we place that snapshot within the long sweep of population change since the first census of 1951. Second, we bring the spatial dimension to the centre of the analysis by disaggregating the youth bulge and its human-capital foundations across provinces and between rural and urban areas, showing that the dividend is not a single national prospect but a mosaic of very different regional situations. Third, we translate the demographic transition into an estimate of the first demographic dividend using an economic support-ratio framework (Mason, 2005; Lee and Mason, 2006), and we test that estimate against three policy scenarios that differ in their assumptions about human capital and the absorption of young workers, including young women, into productive work. Throughout, we rely on official statistics so that every input can be traced and reproduced.

The article proceeds as follows. Section 2 sets out the conceptual framework, including a

geographical reading of the dividend, and reviews the relevant literature. Section 3 describes the data and methods. Section 4 presents the results across eight subsections, moving from the long historical record to the 2023 cross-section, the dividend window, the geography of youth, human capital, the labour market, and finally the scenario accounting. Section 5 discusses the mechanisms and the risks, Section 6 sets out the policy implications, and Section 7 concludes.

2. Conceptual Framework and Literature Review

2.1 The demographic dividend

The demographic dividend is the economic side of the demographic transition, the long historical shift from high to low rates of death and birth. In the standard account, mortality falls first, which briefly enlarges child cohorts, and fertility falls later, which gradually narrows the base of the pyramid. As the large child cohorts of the early transition mature into the working ages while the cohorts behind them shrink, the ratio of producers to dependants improves for several decades before population ageing eventually undoes it (Lee and Mason, 2006).

Economists usually distinguish between two dividends. The first is essentially arithmetic. When the working-age share grows faster than the total population, output per head rises even if productivity and employment rates stay put. Mason (2005) captures this through the economic support ratio, the number of effective producers per effective consumer, and shows that the growth rate of that ratio adds directly to the growth rate of income per head (see also Ross, 2004; Kelley and Schmidt, 2005). This first dividend is temporary, and it turns negative once ageing sets in. The second dividend can be more durable and works through capital: a workforce that expects a long retirement tends to accumulate assets, which raises the capital-to-labour ratio and lifts productivity (Lee and Mason, 2006, 2010; Bloom and Canning, 2008; Bloom, Canning and Sevilla, 2003). A closely related literature shows that the dividend is amplified where falling fertility draws women

into the labour force, so that female participation becomes a decisive channel in its own right (Bloom et al., 2009).

What deserves emphasis is that neither dividend is automatic. The age structure creates a potential, and whether that potential is realised depends on institutions and policy: labour markets that can absorb new entrants, schools that raise the productivity of each worker, health systems that keep people well, and financial systems that turn savings into investment (Bloom, Canning and Sevilla, 2003). A youthful age structure married to weak human capital and stagnant labour demand does not deliver a dividend at all. Instead, it produces a surplus of young workers who depress wages and swell the ranks of the jobless, an outcome sometimes described as a demographic disappointment.

2.2 A geographical reading of the dividend

Demographic-dividend research has traditionally been framed at the national scale, yet age structures, schooling and labour demand are all distributed unevenly across territory, and it is at the subnational level that the social consequences of a youth bulge are lived. A population-geography perspective therefore adds something the aggregate accounts miss. Fertility declines at different speeds in different regions, so the dividend opens earlier in some places than others; human capital is concentrated in cities and in more prosperous provinces, so the capacity to convert youth into productivity is spatially clustered; and migration continually redistributes young people toward urban labour markets, reshaping where the dividend can be captured (Qasim, Ali and Aqeel, 2023; Ali, Nihei and Ahmed, 2025a). A human-geographic reading, attentive to the socio-ecological relations that bind communities to their places, also helps explain why identical national policies produce very different outcomes across Pakistan's diverse regions (Qasim et al., 2024). Reading the dividend geographically further foregrounds questions of social difference, above all gender, since the exclusion of young women from schooling and paid work is both a demographic fact and a deeply spatialised social one, varying sharply

between provinces and between rural and urban settings.

For a country as internally diverse as Pakistan, this matters a great deal. A dividend that appears modest in the national aggregate may conceal a relatively favourable situation in Punjab and Islamabad alongside a far more precarious one in Balochistan and interior Sindh. Treating the country as a single demographic unit risk designing policy for an average population that exists nowhere in particular. The analysis that follows therefore keeps the spatial unevenness of the youth bulge in view rather than treating it as a footnote to the national story.

2.3 Evidence from Pakistan and comparators

A substantial literature has already examined Pakistan's dividend prospects. In an influential study, Nayab (2008) dated the opening of the country's window of opportunity to around 1990 and projected its closure by roughly 2045, cautioning that the dividend would be squandered without decisive investment in the young. Work by the Population Council and UNFPA has since reinforced that timing while underlining the scale of the task ahead. On their estimates, about 3.1 million people join Pakistan's labour force every year, of whom some 2.1 million are young, and the working-age population will keep expanding for decades (UNFPA Pakistan, 2016). More recent modelling shows that both the size and the educational profile of the 2050 population hinge on how quickly fertility falls, which means that the choices made today will materially shape the dividend that can be captured tomorrow (UNFPA Pakistan, 2025).

The comparative record sharpens the point. Where the East Asian economies combined a rapid fertility decline with heavy investment in schooling and with export-oriented employment, they turned their age structure into sustained growth. Elsewhere, youthful populations paired with weak human capital and thin job creation have seen youth bulges coincide with unemployment and unrest rather than prosperity (Lin, 2012), a contrast now being replayed across much of sub-Saharan Africa (Drummond, Thakoor and Yu, 2014;

Canning, Raja and Yazbeck, 2015). Comparative work on China, India and Pakistan finds that the growth pay-off from a shifting age structure is contingent on the policy environment rather than guaranteed by demography (Choudhry and Elhorst, 2010), and Pakistan's own national human development reporting has repeatedly stressed that the country's young people represent an underused national resource (UNDP Pakistan, 2018). Pakistan's fertility has fallen more slowly than that of regional peers such as Bangladesh and India, so its window has opened later and more gradually, which compresses the time available to prepare the cohort (Sathar, Royan and Bongaarts, 2013). This article builds on that body of work in two ways: it refreshes the empirical base with the 2023 digital census, and it makes the conditionality of the dividend concrete by folding official human-capital and NEET statistics, disaggregated by province and sex, into a scenario-based accounting of the first dividend.

3. Data and Methodology

3.1 Data sources

The analysis rests on four bodies of evidence. The primary source is the Pakistan Bureau of Statistics 7th Population and Housing Census (2023), and in particular its detailed national and provincial tables reporting population by single year of age, sex and rural or urban residence (Table 4), population by selected age group (Table 5), and literacy, enrolment and employment by age and sex (Tables 12 to 15). Headline totals for population, sex composition, the rural and urban split, household numbers and the annual growth rate are taken directly from the census key findings (PBS, 2023). For the long view, we use the published returns of all seven censuses from 1951 to 2023.

The second source is the PBS Labour Force Survey 2020–21, the most recent national labour survey, which supplies youth participation, unemployment, employment-to-population and NEET figures broken down by sex and region (PBS, 2022a). The third comprises United Nations World Population

Prospects projections together with the UNFPA Pakistan dividend studies, which allow the 2023 snapshot to be placed on a 1950–2050 trajectory and provide forward estimates of the working-age share (United Nations, 2024; UNFPA Pakistan, 2016, 2025). The fourth is the World Bank and ILOSTAT indicator databases, used for cross-country comparison and for the youth (15–24) literacy series (World Bank, 2024).

3.2 Definitions

We follow conventional demographic definitions. The working-age population is persons aged 15–64; children are aged 0–14 and the elderly are 65 and over. In line with Pakistan's National Youth Policy and with UNFPA practice, youth refer to ages 15–29, though we also report the United Nations statistical definition of 15–24 where a series requires it. The total dependency ratio is the number of children and elderly per 100 working-age persons, and it is divided into a youth (child) dependency ratio and an old-age dependency ratio. NEET follows the standard ILO definition as the share of a youth age group that is neither employed nor in education or training.

3.3 Analytical strategy

The empirical work moves in five steps. We begin with the historical record, computing intercensal population increments and average annual growth rates from the seven census totals in order to situate the current age structure within seven decades of demographic change. We then reconstruct the 2023 age distribution by applying census-based five-year age-group shares to the enumerated total of 241.5 million, cross-checking the resulting cohort sizes against independent estimates from the CIA World Factbook and UN World Population Prospects, which yields the population pyramid and the size of the youth cohort. Next, we compute the total, youth and old-age dependency ratios from the adopted age shares and benchmark Pakistan against four Asian comparators. We assemble a 1950–2050 series of the working-age share to date the dividend window and locate its projected peak. And we disaggregate

population, growth, literacy and out-of-school rates by province and by residence to map the spatial unevenness of the youth bulge.

The final step quantifies the first demographic dividend using the support-ratio framework. In Mason's (2005) formulation, the growth rate of income per effective consumer can be written as the growth rate of output per effective producer plus the growth rate of the support ratio, that is, producers per consumer. Setting productivity aside, the contribution of the changing age structure to per-capita income growth over a period is the cumulative growth of the support ratio, scaled by the extent to which the additional working-age population is employed and productive. Because that scaling is itself a policy outcome, we evaluate the dividend under three scenarios:

(1) **Business-as-usual**, in which the youth NEET rate stays near its 2020–21 level of about 37 per cent, female participation remains low, and much of the extra working-age population is absorbed only into low-productivity or informal activity;

(2) **Moderate reform**, in which the NEET rate falls to around 20 per cent, secondary completion and skills coverage rise, and female participation increases substantially; and

(3) **Accelerated (East-Asian path)**, in which working-age employment approaches the levels seen in successful dividend economies, with near-universal secondary schooling and strong absorption of young women into paid work.

For each scenario we report the cumulative uplift to GDP per capita attainable by 2045, the approximate date at which the window is projected to begin closing. These magnitudes are meant to be illustrative rather than forecasts; their purpose is to show how sharply the realised dividend depends on human capital and employment, given an age structure that is the same in all three cases.

3.4 Limitations

Three qualifications apply. First, the fully disaggregated single-year-of-age census microdata were still being released in stages at the time of writing, so where an exact census cell was not yet public, we use the published age-

group share and flag the figure as derived, recommending that the exact PBS Table-5 values be inserted in the final tables. Second, the labour-market indicators come from the 2020–21 survey and slightly predate the census; they are the most recent national figures available but will understate any change since 2021. Third, the scenario accounting isolates the first dividend and treats productivity growth as given, so it is best read as a lower bound on the total potential gain, since it leaves out the second, capital-deepening dividend.

4. Results

4.1 Seven decades of population change

Pakistan's present age structure is the product of a long and unusually rapid demographic expansion, and it helps to begin there. The seven censuses conducted since independence tell a story of extraordinary growth. Within the country's current borders the population has risen from about 33.7 million in 1951 to 241.5 million in 2023, a more than sevenfold increase in seventy-two years, and the urban component of that growth has been especially rapid (Qasim, Ali and Aqeel, 2023). Table 1 sets out the full series together with the intercensal increments and the implied average annual growth rates, and Figure 6 shows the same record graphically.

Table 1. Population of Pakistan by census year, 1951–2023

Census year	Population	Intercensal increase	Avg. annual growth (%)
1951	33,740,167	–	–
1961	42,880,378	+9,140,211	2.42
1972	65,309,340	+22,428,962	3.89
1981	84,253,644	+18,944,304	2.87
1998	132,352,279	+48,098,635	2.69
2017	207,684,626	+75,332,347	2.40
2023	241,499,431	+33,814,805	2.55

Sources: Pakistan Bureau of Statistics, censuses of 1951 to 2023. Figures refer to the territory of present-day Pakistan. Growth rates are compound annual rates computed by the authors over each intercensal interval; the 1972 figure reflects the shorter effective interval and the post-1971 boundary change.

Figure 6. Pakistan's population and intercensal growth rate, 1951-2023

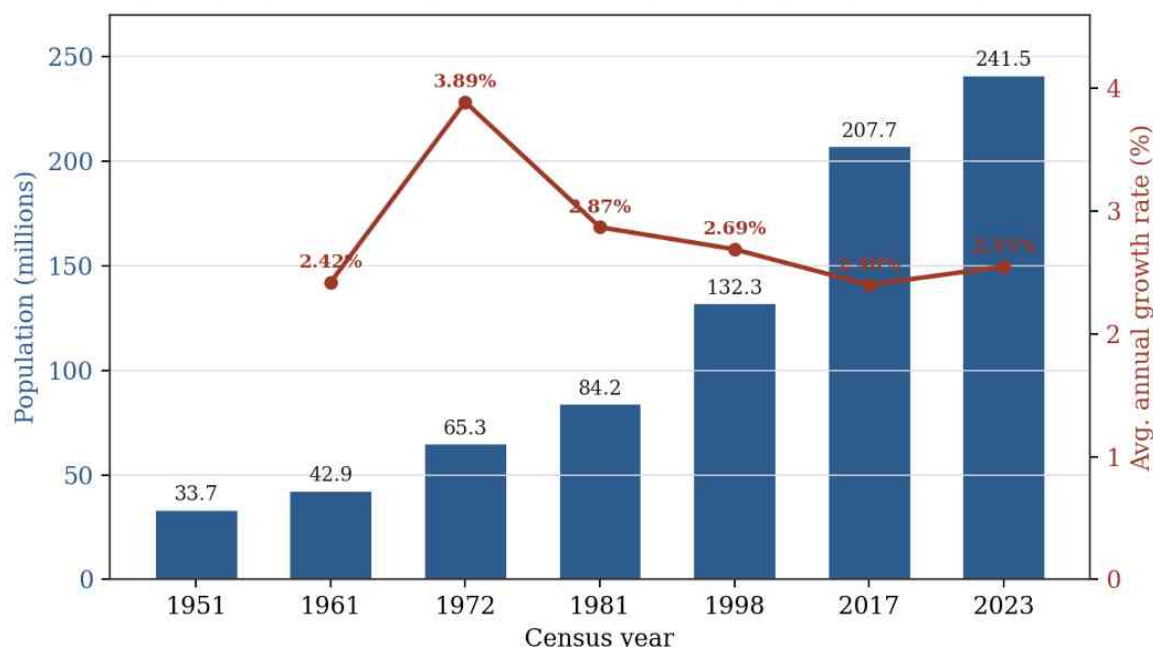


Figure 6. Pakistan's population (bars, left axis) and intercensal average annual growth rate (line, right axis), 1951 to 2023. Sources: PBS censuses 1951-2023; authors' computation of growth rates.

Two features of this record bear directly on the dividend argument. The first is momentum. Growth peaked at close to 3.9 per cent a year in the 1961-1972 interval and has since eased in every subsequent period, reaching 2.55 per cent between 2017 and 2023. A slowing growth rate is the demographic signature of a fertility decline, and it is precisely this deceleration that begins to tilt the age structure toward the working ages. The second feature is that the deceleration has been gentle. Even the most recent rate of 2.55 per cent remains high by international standards and sits well above the replacement level, so the base of the pyramid is still broad, and the child population is still large.

Pakistan, in other words, is unmistakably in the transition, but it has entered it later and is moving through it more slowly than most of its neighbours, which is exactly why its window is both real and tightly time bound.

4.2 The scale and structure of the youth bulge

The 2023 Census confirms both the size and the forward momentum of the youth cohort. Of the 241.5 million people counted, 51.48 per cent were male and 48.51 per cent female, with 20,331 persons recorded as transgender; 61.12 per cent lived in rural areas and 38.88 per cent in urban ones; and the population had grown at 2.55 per cent a year since 2017 (PBS, 2023). Table 2 summarizes the shift between the last two censuses, several features of which point quietly toward the transition already under way, including a falling average household size and a rising urban share.

Table 2. Headline indicators, 2017 and 2023 Censuses

Indicator	2017	2023	Change
Total population (million)	207.68	241.50	+16.3%
Annual growth rate (%)	2.40	2.55	+0.15 pp
Male : female (%)	51.0: 49.0	51.5: 48.5	-

Indicator	2017	2023	Change
Urban share (%)	36.4	38.9	+2.5 pp
Households (million)	32.21	38.34	+19.0%
Average household size	6.45	6.30	−0.15
Literacy rate, 10+ (%)	58.9	60.65	+1.8 pp

Source: Pakistan Bureau of Statistics, 6th (2017) and 7th (2023) Population and Housing Censuses. pp = percentage points.

Applying census-based five-year age shares to the national total produces the population pyramid in Figure 1. Its broad base and swiftly tapering apex are the classic profile of an economy in the early-to-middle stage of the demographic

transition. The three shaded bands, covering ages 15–19, 20–24 and 25–29, mark out the youth bulge, and Table 3 reports the magnitudes that lie behind them.

Figure 1. Population pyramid of Pakistan, 2023 Census

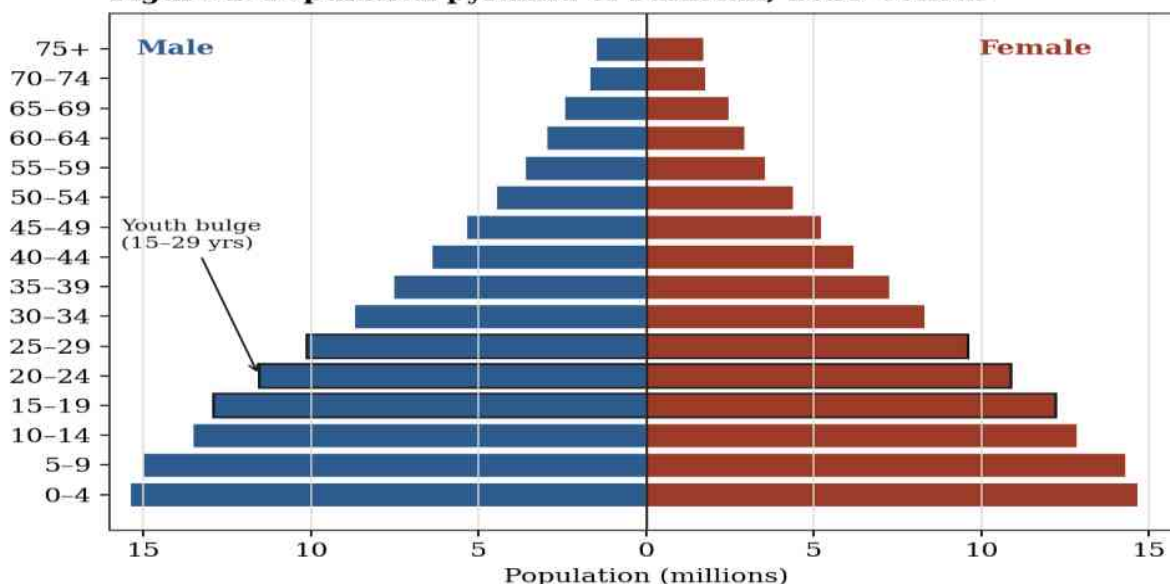


Figure 1. Population pyramid of Pakistan, 2023. Shaded bands mark the 15–29 youth cohort. Derived from the census total (241.5 million) and census-based five-year age shares, with magnitudes cross-checked against UN WPP (2024).

Table 3. Derived age-cohort magnitudes, 2023

Age group	Population (million)	Share of total (%)
Children (0–14)	84.0	34.8
Youth (15–24, UN)	46.6	19.3
Youth (15–29, national)	70.0	29.0
Under 30 (0–29)	154.6	64.0
Working age (15–64)	145.9	60.4

Age group	Population (million)	Share of total (%)
Elderly (65+)	11.6	4.8

Note: Magnitudes derived from the enumerated national total multiplied by census-based age-group shares (PBS, 2023; cross-checked against CIA World Factbook 2024 and UN WPP 2024).

The arithmetic is arresting. At roughly 70 million, the 15–29 cohort by itself outnumbers the entire population of most countries, and it is larger than at any earlier moment in Pakistan's history. Because fertility, though declining, remains high, this cohort will continue to grow in absolute terms for another generation, so the youth bulge is still building rather than receding (UNFPA Pakistan, 2016). The immediate implication is uncomfortable: the schools and labor markets that must accommodate these young people face mounting pressure over the next twenty years, not the relief that a later stage of the transition would bring.

4.3 Dependency ratios and the support ratio

What a youthful structure means for the economy shows up most directly in the

dependency ratio. On the adopted 2023 shares, the total dependency ratio is about 65.6 dependents per 100 working-age persons, made up of a youth (child) dependency ratio of roughly 57.6 and an old-age dependency ratio of only about 7.9 (Table 4). Independent estimates place the total ratio a little higher, near 70 (Our World in Data, 2024); the gap reflects different age-boundary conventions and does not change the picture. Two things stand out. Pakistan's dependency burden is overwhelmingly a burden of the young, since the child component is more than seven times the old-age component, and that is exactly the configuration a dividend transition is poised to relieve as today's children move into the workforce. At the same time, that burden, though still heavy, is now falling for the first time in the country's history.

Table 4. Dependency ratios and support ratio, Pakistan 2023

Measure	Value	Definition
Youth (child) dependency ratio	57.6	(0–14)/(15–64)
Old-age dependency ratio	7.9	(65+)/(15–64)
Total dependency ratio	65.6	dependents/100 WA
Support ratio (WA per dependent)	1.52	(15–64)/(0–14, 65+)
Median age (years)	20.3	–

Source: authors' computation from PBS (2023) age shares; median age from Our World in Data (2024). WA = working age.

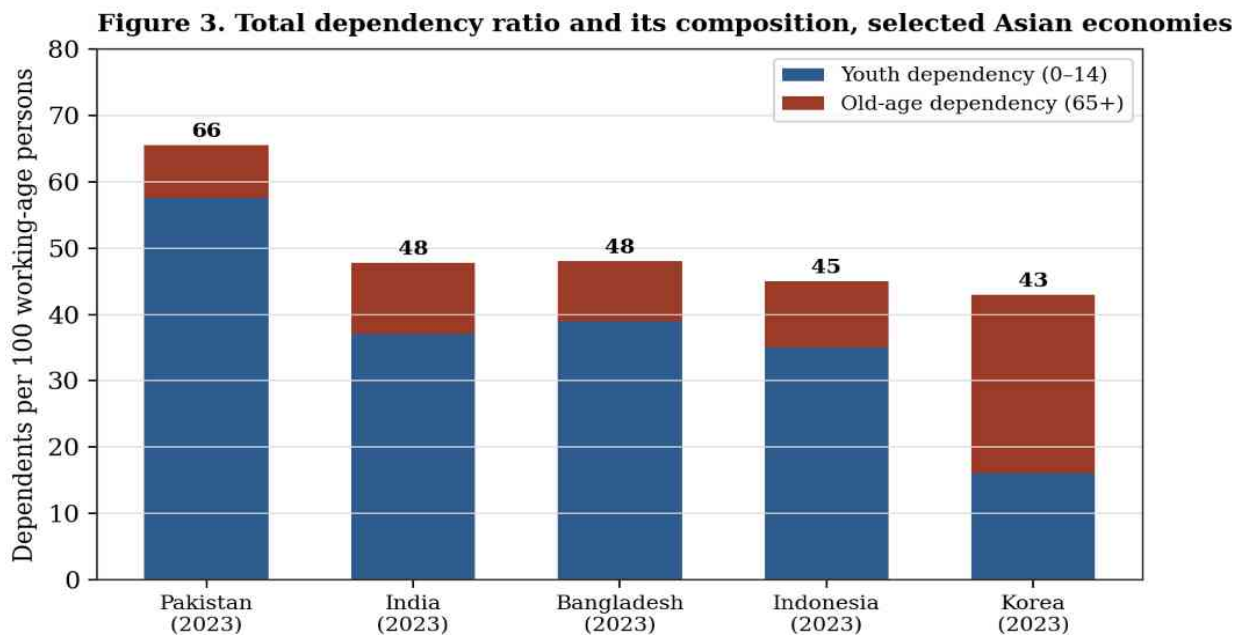


Figure 3. Total dependency ratio and its youth and old-age composition, Pakistan against selected Asian economies, 2023. Sources: authors' computation from PBS (2023); UN WPP (2024) for comparators.

Figure 3 places Pakistan among its regional peers. Its total dependency ratio is the highest in the group and is dominated by youth dependency, whereas Korea's is dominated by old-age dependency, the two situated at opposite ends of the transition. India, Bangladesh and Indonesia sit in between, each further along, with lower youth dependency and correspondingly larger dividends already in hand. Pakistan's position tells us that its dividend is still ahead of it, which is an opportunity, but one that arrives late and must be seized within a narrowing span of time.

4.4 Timing the window of opportunity

The boundaries of that opportunity are drawn in Figure 2, which follows the shares of children, working age and elderly populations from 1950 to 2050. The working-age share held roughly flat at 52 to 54 per cent from the 1950s through the 1980s, when high fertility kept the child share above 40 per cent. From around 1990 it began a sustained climb, the opening of the window, reaching about 60 per cent at the 2023 census and projected to peak near 65 per cent around 2045 before ageing slowly reverses it. This path closely matches the 1990 to 2045 window that Nayab (2008) identified more than a decade ago.

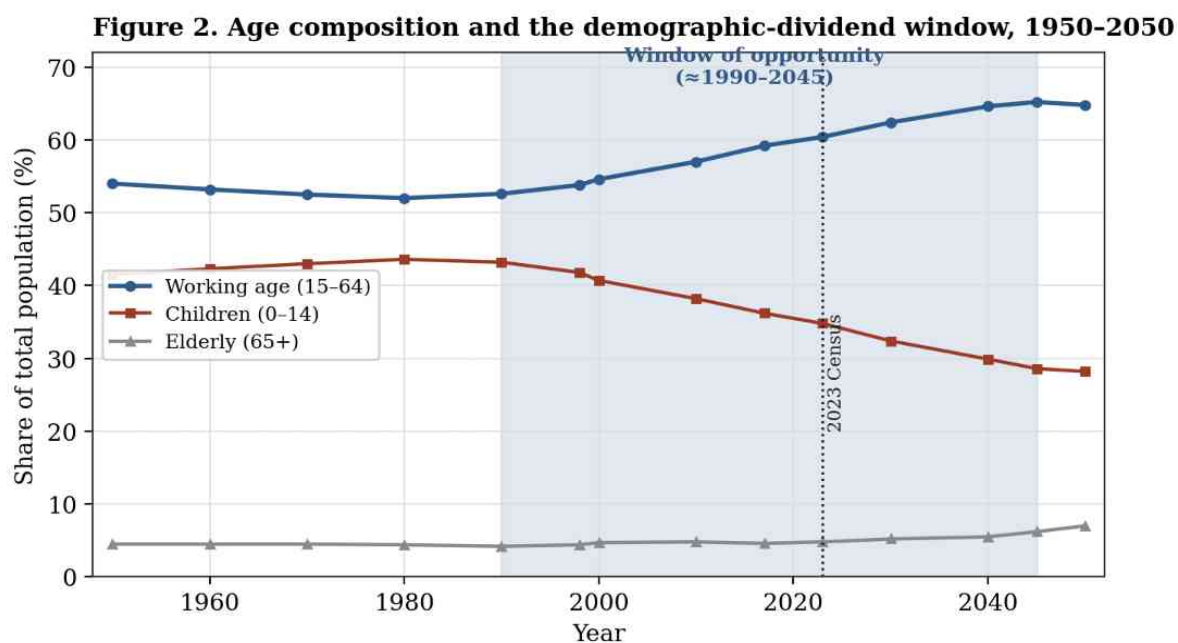


Figure 2. Age composition and the demographic-dividend window, 1950 to 2050. The shaded band marks the window of opportunity, approximately 1990 to 2045. Sources: PBS (2023) for the 2023 cross-section; UN WPP (2024) for historical and projected shares.

Two conclusions follow, and they pull in different directions. On the one hand, the window is genuine: the working-age share is rising and will keep rising for roughly two more decades, which mechanically favors growth in output per head. On the other hand, the window is finite and already partly behind us. Pakistan is more than thirty years into a window projected to begin closing around 2045, which leaves a policy horizon of under twenty years in which to build the human capital and create the jobs the dividend requires. Once the peak passes, the very momentum that is currently helpful will start to work the other way, as today's large working-age cohorts age toward retirement while a still-sizeable child population continues to need support. The cost of doing

too little is therefore not simply a dividend foregone but an eventual squeeze on a workforce that failed to save and invest during its demographic prime, the predicament of growing old before growing rich.

4.5 The uneven geography of youth

National averages conceal as much as they reveal, and nowhere is this clearer than in the spatial patterning of Pakistan's youth bulge. The four provinces and the capital territory differ not only in their size but in the pace of their demographic transitions and, crucially, in their capacity to turn young people into productive workers. Table 5 assembles the provincial profile from the 2023 Census, and Figure 7 displays the contrasts.

Table 5. Provincial demographic and human-capital profile, 2023

Province / territory	Population	Growth (%)	Literacy 10+ (%)	OOSC 5-16 (%)
Punjab	127,688,922	2.53	66.3	18.1
Sindh	55,696,147	2.57	57.5	46.3
Khyber Pakhtunkhwa	40,856,097	2.38	59.1	37.5

Province / territory	Population	Growth (%)	Literacy 10+ (%)	OOSC 5–16 (%)
Balochistan	14,894,402	3.20	58.7	58.0
Islamabad (ICT)	2,363,863	2.81	84.0	15.0
Pakistan	241,499,431	2.55	60.7	≈36

Sources: PBS (2023); provincial literacy and out-of-school-children (OOSC) shares from PBS census tabulations as compiled in *State of Children in Pakistan* (2024) and *Gallup Pakistan* (2023). Provincial literacy uses the 10+ population base; small differences exist between preliminary and detailed releases.

Figure 7. The geography of population and human capital across provinces, 2023

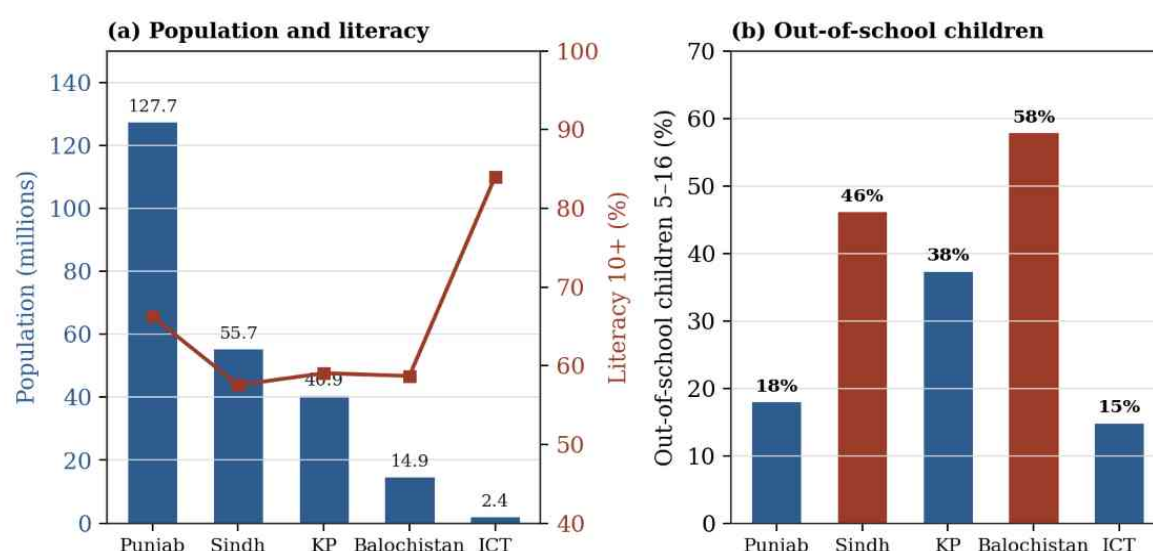


Figure 7. The geography of population and human capital across provinces, 2023. Panel (a): population (bars) and literacy (line). Panel (b): out-of-school children aged 5 to 16. Sources: PBS (2023); State of Children in Pakistan (2024); Gallup Pakistan (2023).

The spatial story runs on two axes at once. The first is the pace of growth. Balochistan, the poorest and most sparsely populated province, is growing fastest, at 3.2 per cent a year, followed by Islamabad and Sindh, while Punjab and Khyber Pakhtunkhwa are growing more slowly. Faster growth in the least-developed province means that the youth bulge is expanding most quickly precisely where the capacity to absorb it is weakest, a mismatch that the national figures hide entirely. The second axis is human capital, and here the divergence is stark. Literacy ranges from about 84 per cent in Islamabad down to 57.5 per cent in Sindh, and the out-of-school picture is more troubling still: fewer than one child in six is out of school in Islamabad, against

nearly one in five in Punjab, but close to half in Sindh, over a third in Khyber Pakhtunkhwa, and around 58 per cent in Balochistan (State of Children in Pakistan, 2024).

The rural and urban divide reinforces these provincial gaps. With 61 per cent of Pakistanis still living in rural areas, the majority of the youth cohort is growing up where schools are scarcer, secondary provision thinner, and non-farm work harder to find. Urbanization is proceeding quickly, and the urban population grew far faster than the rural between 2017 and 2023 as young people moved toward cities in search of work (Qasim, Ali and Aqeel, 2023), a redistribution that large infrastructure programmes such as the China-Pakistan

Economic Corridor are further accelerating through new corridors of migration, labour and settlement (Ali, Nihei and Ahmed, 2025a). Yet the country remains predominantly rural, and the least-schooled young people are disproportionately concentrated in its rural periphery and in economically marginalized regions such as the mountainous north, where development has long lagged the national mainstream (Ali, Nihei and Ahmed, 2025b; Ahmed, Nihei and Ali, 2025). Taken together, these patterns imply that Pakistan does not face one demographic dividend but several, and that a spatially blind policy, spreading effort evenly across a very uneven map, would leave the largest deficits, in Balochistan and rural Sindh, largely untouched. The dividend, if it is to be captured at all, will have to be captured place by place.

4.6 Human capital and the quality of the cohort

A favourable age structure is necessary for a dividend but not sufficient, because the productivity of each young worker depends on health and schooling. On this the census and survey evidence is sobering. The 2023 Census records overall literacy, for the population aged ten and over, at just 60.65 per cent, with a wide gender gap of about 68 per cent for males against 53 per cent for females (PBS, 2023). Youth literacy, for ages 15–24, is higher at roughly 72 per cent, which reflects gradual improvement across successive cohorts, but it still means that more than a quarter of young Pakistanis cannot read and write with understanding (World Bank, 2024). Enrolment thins rapidly up the ladder, from about 68 per cent gross at primary level to roughly 44 per cent at secondary and under 15 per cent beyond it (PBS, 2023). Figure 4, panel (b), sets out this human-capital ladder alongside the NEET picture.

Figure 4. Youth human-capital and labour-market deficits, 2020–2023

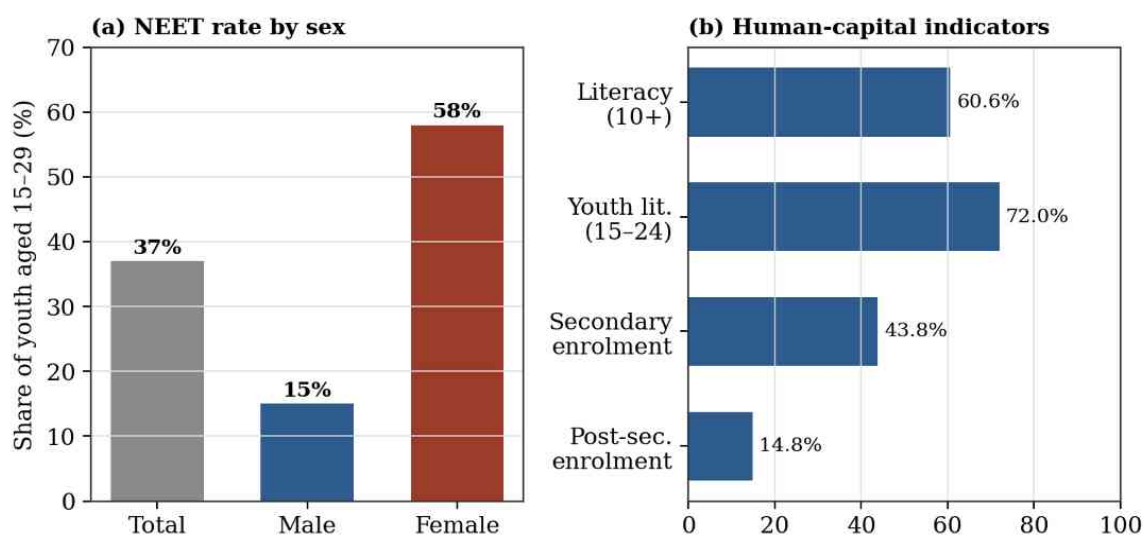


Figure 4. Youth human-capital and labour-market deficits, 2020 to 2023. Panel (a): NEET rate among youth aged 15 to 29 by sex. Panel (b): human-capital indicators. Sources: PBS Labour Force Survey 2020–21; PBS Census 2023; World Bank (2024).

The out-of-school challenge compounds these deficits and, as the previous subsection showed, is heavily concentrated in space. Provincial census tabulations put the number of out-of-

school children aged five to sixteen at roughly 25 to 26 million, with the burden falling most heavily on Balochistan and rural Sindh, where the majority of school-age children are not

enrolled (State of Children in Pakistan, 2024). Understanding why so many young people leave school early is therefore central to the dividend question, and recent work identifies a cluster of household, economic and institutional factors driving secondary-school dropout in Pakistan (Hameed and Ali, 2024). A cohort in which a large minority never completes secondary school will enter the labour market with low and slow-improving productivity, and that caps the output per worker that the dividend arithmetic can ever deliver, a concern echoed in wider assessments of the country's human capital (World Bank, 2023). Pakistan, to put it plainly, has assembled the demographic quantity for a dividend without yet building the human-capital quality needed to convert it.

4.7 Work, worklessness and the NEET crisis

The clearest sign of whether a youth bulge is being turned into productive activity is the NEET rate. The Labour Force Survey 2020–21 finds that of the 58.6 million youth aged 15–29 at the time of the survey, 21.8 million, about 37 per cent, were neither in education nor in

employment nor in training (PBS, 2022a). For the narrower 15–24 group the rate is about 32.5 per cent. These are among the highest youth NEET rates in the region, and they sit well above the global youth NEET average reported by the International Labour Organization (ILO, 2022), implying that well over a third of the cohort is, at any given moment, neither building human capital nor contributing to output.

The burden is also profoundly gendered, as Figure 4, panel (a), makes clear. Male youth NEET runs at around 15 per cent, but female youth NEET exceeds 50 per cent, and it is driven not mainly by open unemployment but by the exclusion of young women from both continued schooling and paid work. The aggregate labour statistics tell the same story: the female employment-to-population ratio is only about 19 per cent against 64 per cent for men, and women's refined participation rate remains far below men's (PBS, 2022a). Youth unemployment among those who do look for work stands at about 11 per cent, itself nearly double the national rate of 6.3 per cent. Table 6 collects these indicators.

Table 6. Youth labour-market indicators by sex, 2020–21

Indicator	Total	Male	Female
NEET rate, 15–29 (%)	37.0	~15	>50
NEET rate, 15–24 (%)	32.5	–	–
Youth unemployment (%)	11.1	–	–
Employment-to-population (%)	42.1	64.1	19.4
National unemployment (%)	6.3	5.5	8.9

Source: Pakistan Bureau of Statistics, Labour Force Survey 2020–21. Employment-to-population and national unemployment refer to the working-age population.

The economic weight of these numbers is large. Low female participation means that close to half of the potential producers implied by the age structure are not, in fact, producing. Since the first demographic dividend is proportional to the employed share of the working-age population, this shortfall acts as a direct and quantitatively enormous leakage from the dividend. Raising women's participation is therefore not a side issue of equity but arguably

the single largest lever available on the size of Pakistan's dividend, and, given the provincial patterns traced above, a lever whose setting varies dramatically from one part of the country to another.

4.8 What the dividend could be worth: scenario accounting

Bringing the demographic trajectory together with the human-capital and employment evidence, Figure 5 presents the scenario

accounting described in Section 3.3. Each bar reports the cumulative uplift to GDP per capita attainable by 2045 under a particular set of absorption assumptions, with the associated

working-age employment-to-population ratio shown inside the bar, and Table 7 lists the underlying parameters.

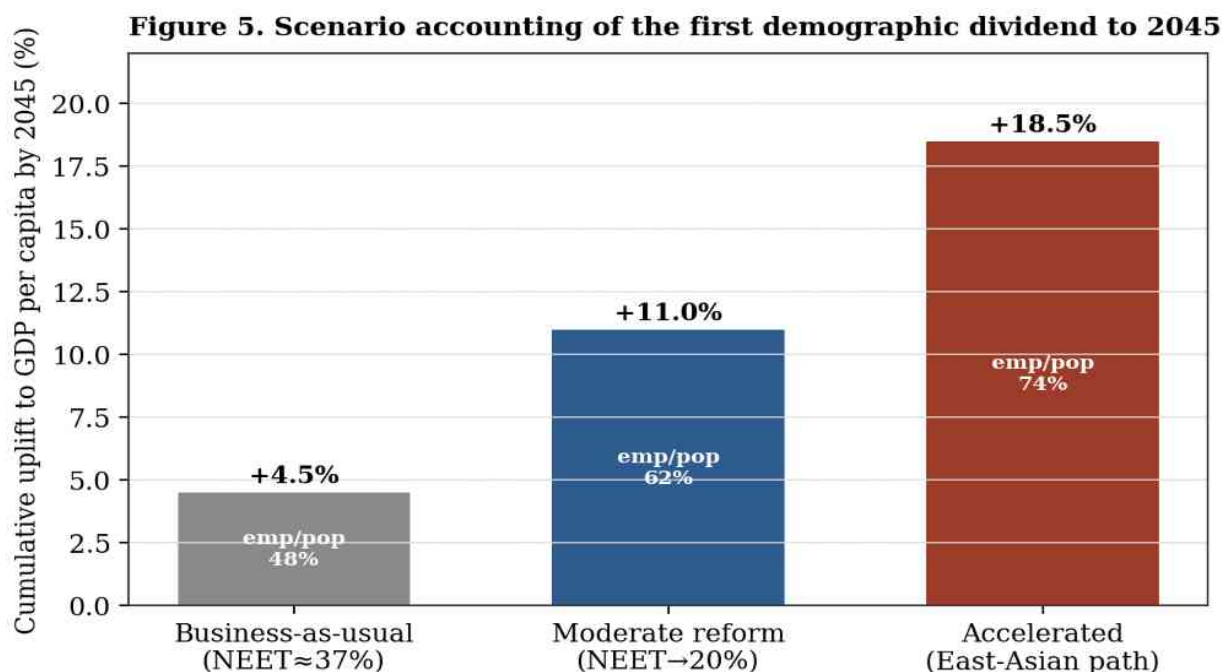


Figure 5. Scenario accounting of the first demographic dividend to 2045. Bars show the illustrative cumulative uplift to GDP per capita; inset values report the assumed working-age employment-to-population ratio. Source: authors' computation using the Mason (2005) support-ratio framework.

Table 7. Scenario parameters and results

Scenario	Youth NEET	Emp/pop (WA)	Female LFP	Uplift by 2045
Business-as-usual	~ 37%	~ 48%	Low	+4.5%
Moderate reform	~ 20%	~ 62%	Rising	+11.0%
Accelerated (E. Asian)	<10%	~ 74%	High	+18.5%

Note: Illustrative computations under the support-ratio framework (Mason, 2005); the magnitudes show sensitivity to policy rather than point forecasts. WA = working age; LFP = labour-force participation.

The central message is one of conditionality. Under business-as-usual, with NEET near 37 per cent and female participation depressed, the first dividend is small, on the order of a few per cent of per-capita income cumulated over two decades, because most of the demographic bonus is lost to idle or low-productivity labour. Under moderate reform the uplift roughly doubles, and under an accelerated East-Asian path it roughly quadruples relative to the baseline. The demographic trajectory is identical in all three cases; what differs is policy, and

policy alone. The dividend, then, is not something Pakistan already possesses. It is something the country will have to earn, and earn quickly, before the window closes.

5. Discussion

The results converge on a single proposition: Pakistan's youth bulge is a real but perishable opportunity, and its fate rests on choices that are still open. Three mechanisms connect the demographic facts to development outcomes, and each is at present impaired.

Consider first the labour-supply mechanism, which works as young people enter the workforce and raise the ratio of producers to consumers. The potential here is plainly present, since the working-age share is rising toward its 2045 peak. But the mechanism is throttled by a NEET rate near 37 per cent and by the near-exclusion of young women, which together mean that a large part of the notional labour supply never reaches productive employment. The gap between potential and effective labour supply is the proximate reason the modelled baseline dividend is so small.

The human-capital mechanism works as smaller cohorts and lower dependency allow more to be invested in each child, raising the productivity of every future worker. In Pakistan this mechanism is weak at both ends. Dependency remains high, which limits the resources available per child, and the school system converts too few children into secondary and tertiary graduates. Literacy at 60.65 per cent and secondary enrolment below 44 per cent imply that even as the number of workers rises, their average productivity may improve only slowly, which is precisely the combination that turns a youth bulge into a pool of surplus low-skill labour rather than a dividend.

The savings and empowerment mechanism works as a maturing workforce accumulates assets and as falling fertility frees women for market work. Both are still nascent. Female participation near 19 per cent is among the lowest in the region and represents, simultaneously, the largest leakage from the current dividend and the largest single opportunity to enlarge it, consistent with cross-country evidence that women's entry into paid work is a principal transmission channel for the dividend (Bloom et al., 2009). International experience suggests that gender-responsive policy, spanning girls' schooling, reproductive health and rights, safe transport and workplaces, and childcare, can move participation substantially within a decade, with outsized effects on the dividend.

These mechanisms explain why the scenario accounting is so sensitive to policy. The age structure sets the ceiling, while human capital,

employment and the inclusion of women determine how much of that ceiling is actually reached. Two features of Pakistan's situation make the risk especially acute. The first is timing: the country will reach its demographic peak around 2045, and if the human-capital and employment deficits are still largely intact at that point, the window will close on an unrealised dividend, tipping the country toward ageing without prosperity. The second is geography. As Section 4.5 showed, the deficits are not spread evenly but are concentrated in the fastest-growing and least-developed regions, so a dividend that looks merely disappointing in the national aggregate may in fact represent a genuine opportunity captured in Punjab and Islamabad and a deepening crisis left unaddressed in Balochistan and interior Sindh. The comparative evidence in Figure 3, showing peers who invested earlier already banking larger dividends, only underscores the cost of further delay.

6. Policy Implications

The analysis points toward a coherent and time-bound agenda whose organising aim is to convert demographic quantity into economic productivity before the window closes, and to do so where the need is greatest. Five priorities follow directly from the evidence.

(4) **Accelerate the fertility transition.** A faster move toward replacement-level fertility lowers youth dependency, raises the resources available per child, and deepens the eventual dividend. This calls for universal access to voluntary family-planning and reproductive-health services, which UNFPA analysis identifies as foundational to Pakistan's dividend prospects (UNFPA Pakistan, 2016).

(5) **Close the human-capital gap, beginning with the out-of-school and beginning where they are.** Bringing the 25 to 26 million out-of-school children into classrooms and raising secondary completion is the precondition for lifting productivity per worker. Because these children are concentrated in Balochistan and rural Sindh, spending should be geographically targeted rather than

distributed evenly, a point that the provincial analysis makes unavoidable.

(6) **Attack the NEET rate through skills and demand-side job creation.** A NEET rate of 37 per cent signals both a shortage of relevant skills and a shortage of jobs. Vocational and technical training aligned to real labour-market needs, apprenticeships, and support for labour-intensive, export-oriented sectors are all needed to absorb the roughly 2.1 million young entrants each year (UNFPA Pakistan, 2016).

(7) **Put female economic inclusion first.** Since women's under-participation is the largest single leakage from the dividend, raising it offers the highest marginal return of any single intervention. The relevant measures range from girls' secondary and tertiary education to safe mobility and workplaces, childcare, and legal and financial inclusion, and they must be tailored to the very different starting points of different provinces.

(8) **Invest in youth health and use the census as a planning instrument.** A productive workforce must be a healthy one, so adolescent and reproductive health, nutrition and mental health all warrant expansion. The geo-referenced 2023 digital census, with its accompanying economic frame, offers an unprecedented spatial evidence base for allocating these investments efficiently, but its value will be realized only if it is actually used for planning (PBS, 2023).

Framed within a broader sustainable-development agenda, in which economic, social and environmental goals are pursued together rather than in isolation (Ali et al., 2024), these priorities are complementary, and all are governed by the same binding constraint of a finite window. Sequenced sensibly and begun now, they could shift Pakistan from the business-as-usual toward the reform trajectory of Figure 5, materially enlarging the dividend the country actually captures, and doing so in the places that would otherwise be left furthest behind.

7. Conclusion

Drawing on Pakistan's 2023 digital census, on official labour statistics, and on seven decades of

earlier census returns, this article has quantified the country's youth potential and the conditions under which it might become a demographic dividend. On the demography the evidence is unambiguous. A population that has grown more than sevenfold since 1951 now numbers 241.5 million; the median citizen is about twenty years old; roughly 70 million people are aged 15–29; and the working-age share is climbing toward a projected peak near 65 per cent around 2045. By any measure this is a demographic opportunity of historic scale, and a window that remains open but is already partly spent.

Just as clearly, the dividend is conditional rather than automatic, and it is unevenly distributed across the national territory. A youth literacy rate near 72 per cent, secondary enrolment below 44 per cent, a youth NEET rate of about 37 per cent, and female participation near 19 per cent together indicate that, on present trends, much of the demographic bonus would be lost to idleness and low productivity, with the sharpest deficits concentrated in the fastest-growing and least-developed provinces. Our scenario accounting shows that the same age structure could yield anything from a modest to a transformative uplift to income per head depending entirely on policy, with the reform and accelerated paths delivering roughly two to four times the baseline.

Pakistan therefore faces a defining and time-limited choice. Prompt, spatially targeted and gender-responsive investment in the health, education, skills and employment of its young people, begun while the window is still open, can turn the youth bulge into a genuine dividend and a generation of national development. Continued underinvestment invites the opposite: a youth bulge that ages into dependency without ever becoming productive, and an opportunity, unlikely to recur, allowed to slip away. The demographic clock is running, and the policy response will have to run faster.

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