

***From demographic pressure to dividend:
A regime-switching analysis of algeria's economic growth
1962-2022***

من الضغط الديموغرافي إلى العائد الديموغرافي: تحليل قائم على تبدل الأنظمة للنمو الاقتصادي في الجزائر، 1962-2022

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Article abstract:

This paper analyzes the relationship between demographic transition and economic growth in Algeria over the period 1962–2022. Using the Bai-Perron test, three demographic regimes are identified: high pressure, accelerated transition, and the dividend window. A regression model with interaction terms reveals strong heterogeneity in growth determinants across these phases. Investment, initially insignificant, becomes negative during the transition and later turns positive. Human capital, despite an initial positive effect, shows a persistently weak impact over time. Resource rents play a crucial role, particularly during the crisis period. Overall, the demographic dividend is found to be necessary but not sufficient for sustainable economic development.

Key words : economic growth; demographic transition ; demographic dividend ; structural break ; interaction model.

ملخص المقال :

تحلل هذه الدراسة العلاقة بين التحول الديموغرافي والنمو الاقتصادي في الجزائر خلال الفترة 1962-2022. وباستخدام اختبار باي-بيرون، تم تحديد ثلاثة أنظمة ديموغرافية: ضغط مرتفع، انتقال متسارع، ونافذة العائد الديموغرافي. ويُظهر نموذج انحدار يتضمن تفاعلات وجود تباين كبير في محددات النمو عبر هذه المراحل. كان تأثير الاستثمار غير معنوي في البداية، ثم أصبح سلبياً خلال مرحلة الانتقال، قبل أن يتحول إلى إيجابي لاحقاً. أما رأس المال البشري، فرغم تأثيره الإيجابي الأولي، فقد ظل ضعيف الأثر على المدى الطويل. كما لعبت عوائد الموارد دوراً حاسماً، خاصة خلال فترة الأزمة. وبشكل عام، يتبين أن العائد الديموغرافي شرط ضروري لكنه غير كافٍ لتحقيق تنمية اقتصادية مستدامة.

كلمات مفتاحية: النمو الاقتصادي؛ التحول الديموغرافي؛ العائد الديموغرافي؛ الانكسار الهيكلي؛ نموذج التفاعل.

Introduction

Few changes reshape a nation more than its demographic transition, the passage from a society of high birth and death rates to one where both are low. The promise, long recognized by economists, is a "demographic dividend": a window in time when a larger, more productive workforce can drive a surge in savings and investment, fueling economic growth (World Bank, 2021).

But this promise is not self-fulfilling. Realizing the dividend is another matter entirely. A country's success is ultimately forged by its institutions, its policies, and its economic structure (Acemoglu & Robinson, 2019). For resource-rich nations, in particular, the story is often one of missed opportunities. Here, the gains from a demographic shift are easily squandered, wiped out by the volatility and distortions of a commodity-based economy—the classic "Dutch disease" (Ross, 2017). The window closes, leaving the country with an aging population and an economy that never diversified.

This is precisely the challenge that makes Algeria such a compelling case. Since 1962, the country has undergone a demographic upheaval of breathtaking speed, transforming its age structure in a single generation. Yet its economy has remained tethered to hydrocarbons, a textbook example of a rentier state (IMF, 2023). This dual reality makes Algeria a critical case study; it offers a rare chance to see how a potent demographic tailwind interacts with the powerful undertow of resource dependency.

Most research treats demography as a simple input to growth. Our work challenges this linear view. We argue that the demographic transition is more fundamental: it reconfigures the very engine of growth. The economic "rules of the game" are not fixed; they are rewritten by the country's evolving population structure. This leads us to the central puzzle of this paper:

How did Algeria's demographic evolution fundamentally reshape the growth effects of its core economic inputs: investment, human capital, and resource wealth?

To answer this, our research has three goals. First, to identify the distinct phases of Algeria's demographic journey using structural break analysis. Second, to measure how the power of each growth driver changed from one phase to the next. And third, to analyze what these findings mean for any resource-rich country hoping to capture its own demographic dividend.

Our core hypotheses are straightforward:

H1 – Algeria's demographic path was not a gradual slope but a series of abrupt shifts, creating distinct, statistically meaningful regimes.

H2 – The returns on investment and human capital will be significantly blunted during the early phase of intense population pressure compared to the later "dividend" phase.

H3 – The impact of hydrocarbon rents on growth was itself unstable, its effect determined by the prevailing demographic context.

The rest of this paper unfolds as follows. Section 2 lays out our data and methodological strategy, which joins the Bai-Perron test with a regime-switching regression framework. Section 3 presents the results of this regime identification. In Section 4, we lay out the central econometric findings that trace the evolving impact of each growth driver. The paper concludes in Section 5 with a discussion of the consequences of our work for both economic thought and policy design.

1. Literature review

A large body of research links population dynamics to macroeconomic performance, but it also shows that the relationship is neither mechanical nor stable over time. Classical growth theory emphasizes capital accumulation and technological change as proximate engines of long-run development (Romer, 1990), while demographic approaches highlight that changes in age structure can reshape savings behavior, labor supply, and the feasibility of human capital formation. The "demographic dividend" framework formalizes this idea



by arguing that declining fertility and mortality can create a temporary period in which the working-age share rises, easing dependency burdens and improving the conditions for growth (Bloom et al., 2003; Lee, 2003). Evidence from East Asia has been particularly influential in showing how favorable age-structure shifts can support economic take-off when accompanied by effective policy and institutional arrangements (Mason, 2001).

However, the literature is equally clear that demographic opportunity is contingent. Aggregate correlations between population change and growth often conceal distinct mechanisms operating through different components of demographic structure, and these components may pull in opposite directions across stages of the transition (Kelley & Schmidt, 1995). The same demographic shift that strengthens the potential for saving and investment can fail to translate into growth if the economy cannot allocate capital efficiently, absorb a larger workforce, or reward skills in the labor market. In this regard, a central message of the demographic dividend literature is that population structure may be a favorable background condition, but it does not substitute for the institutional and policy foundations required for sustained development (Lee & Mason, 2010).

This conditionality is especially salient in resource-rich economies. The political economy literature on rentier states argues that large external rents can weaken incentives for diversification and productive capacity building, reshaping state-society relations in ways that hinder broad-based development (Beblawi, 1987). Related work on resource dependence documents how commodity-based structures can distort relative prices, foster volatility, and crowd out tradable sectors, generating a pattern consistent with “Dutch disease” mechanisms and long-run underperformance (Ross, 2017). Moreover, resource abundance may interact with human capital in paradoxical ways: even as education expands, the returns to skills may remain weak if the economic structure does not generate sufficient productive jobs, if public and private sectors do not demand higher skills, or if resource revenues reduce the pressure to innovate (Gylfason, 2001). From this perspective, a demographic window may open under a rentier structure, yet the growth payoff can remain limited if structural and institutional constraints persist (Acemoglu & Robinson, 2019).

A further implication from both demographic and macroeconomic research is that long time horizons are rarely governed by a single stable regime. Theoretical narratives of the demographic transition emphasize distinct stages rather than smooth linear change (Lee, 2003), and empirical growth processes are often marked by discontinuities driven by shocks, policy shifts, and structural transformations. Econometric work on multiple structural breaks provides tools to identify such regime shifts endogenously rather than imposing arbitrary sub-periods (Bai & Perron, 2003). For growth regressions, this is not a purely technical concern: if coefficients vary across regimes, full-sample estimates that assume parameter stability may yield averages that misrepresent the underlying dynamics and lead to misleading policy interpretations. Consequently, modeling strategies that allow the effects of core growth inputs to differ across identifiable phases—while preserving statistical power—are well aligned with the goal of understanding heterogeneous development paths (Wooldridge, 2015).

The credibility of inference in long-run annual time series requires careful attention to small-sample limitations and the dependence structure of residuals. Standard diagnostic tests may have limited power in modest samples, especially when growth rates are volatile and subject to episodic shocks (Achen, 1982; Greene, 2018). Robust covariance estimators that remain valid under heteroskedasticity and autocorrelation are therefore widely recommended for reliable hypothesis testing in time-series regressions (Newey & West, 1987). Together, these methodological insights support an approach that (i) lets demographic data reveal statistically meaningful regime changes, and (ii) evaluates whether the growth effects of investment, human capital, and resource rents differ across those regimes, rather than assuming a single set of “rules of the game” over six decades.

2. Data and methods

We test our hypotheses with a two-step econometric model on annual data from 1962-2022. The first step identifies demographic regime shifts. The second tests how these shifts altered the effectiveness of growth drivers.

2.1 Data and Variables

Data are primarily from the World Bank's (World Development Indicators-WDI). We model the growth in real GDP per capita as a function of several key predictors, consistent with the growth literature (Romer, 1990):

- Investment: Gross fixed capital formation (% of GDP).
- Human Capital: Gross secondary enrollment rate: This proxy is used due to long-run data constraints, although it measures educational flow rather than the stock of accumulated human capital.
- Resource Rents: Natural resource rents (% of GDP).
- Trade Openness: Exports plus imports (% of GDP) as a control.

The variable used to define these regimes is the total dependency ratio: the population under 15 and over 64, divided by the population aged 15-64.

2.2 The First Step: Letting the Data Define the Regimes

To endogenously identify the demographic regimes, we dispense with pre-set timelines. Instead, we apply the Bai and Perron (2003) multiple structural break test directly to the total dependency ratio series. The test locates m unknown break points ($T_1, \dots, T_m$) by estimating the following linear regression model:

$$y_t = x'_t B_j + u_t \quad \text{For } t = T_{j-1} + 1, \dots, T_j$$

where $j = 1, \dots, m+1, T_0 = 0$ et $T_{m+1} = T$ In our model, y_t is the dependency ratio, and we test for breaks in its mean by regressing it on a constant. The break dates are chosen to minimize the sum of squared residuals across all segments.

We specified two breaks ($m = 2$), defining three regimes, which aligns with standard demographic transition theory (Lee R. , 2003). This also keeps the model parsimonious. The estimated dates, $\hat{T}_1$ and $\hat{T}_2$, then allow us to create phase dummies for the main analysis.

2.3 The Second Step: Analyzing Growth Dynamics Across Regimes

Once the regimes are set, we test for heterogeneous impacts from the growth drivers. To preserve statistical power, we avoid sub-sample estimation in favor of a full-sample ($N=61$) interaction model (Wooldridge, 2015). Phase 1 (1962– $\hat{T}_1$) is the omitted baseline category. The estimated model is specified as:

$$Growth_t = \beta_0 + \alpha_2 D_{2,t} + \alpha_3 D_{3,t} + \sum_{j=1}^k \beta_j X_{j,t} + \sum_{i=2}^3 \sum_{j=1}^k \gamma_{ij} (X_{j,t} \times D_{i,t}) + \varepsilon_t$$

The components of this model are defined as:

- **Growth_t**: The annual growth rate of per capita GDP.
- **D_{i,t}**: An indicator variable equal to 1 if year t belongs to Phase i , and 0 otherwise.
- **X_{j,t}**: The vector of our k explanatory variables (Investment, Human Capital, Resource Rents, Openness).
- **β_j**: The coefficient for variable X_j representing its impact during the Phase 1 reference period.

- γ_{ij} : The interaction coefficient, which captures the differential impact of X_j in Phase i relative to Phase 1. The total effect of X_j in Phase i is therefore given by the sum $(\beta_j + \gamma_{ij})$.

Valid inference from our OLS model requires addressing potential heteroskedasticity and autocorrelation in ε_t . We therefore test for autocorrelation (Breusch-Godfrey) but, for the sake of robustness, correct the standard errors regardless. To do this, we employ Newey-West (HAC) standard errors, which are consistent under both conditions (Newey & West, 1987).

3. Results

4.1 Finding the Breakpoints in Algeria's Demographic Story

Our first task was to move beyond simple chronology and let the data define Algeria's demographic eras. We applied the Bai-Perron structural break test to the total dependency ratio series from 1962 to 2022. This method is prized for its ability to endogenously uncover regime shifts in time-series data (Bai & Perron, 2003).

Guided by demographic transition theory, which maps out a three-stage sequence (pre-transition, transition, and post-transition), we set the test to find two distinct break points (Lee R. , 2003). This choice provides a theoretically grounded framework that is also clean and parsimonious. Table 1 reports the results of this estimation.

Table 1. Estimated Structural Breaks and 95% Confidence Intervals

Break	Estimated Year	95% Confidence Interval
1	1983	[1982 - 1984]
2	1993	[1992 - 1994]

Source: Author's calculations using World Bank (2023) data. Break points were identified with the Bai-Perron (2003) test.

The test points to a first break in 1983 and a second in 1993. These statistically-determined dates align strikingly with major socioeconomic turning points for the country: the end of the post-independence baby boom and the onset of a period of crisis and restructuring. This segmentation gives us three phases with distinct demographic profiles, which are summarized in Table 2.

The table highlights a dramatic transformation. But to confirm these are truly distinct regimes, we need to look beyond their simple averages and examine the distribution of the data within each phase.

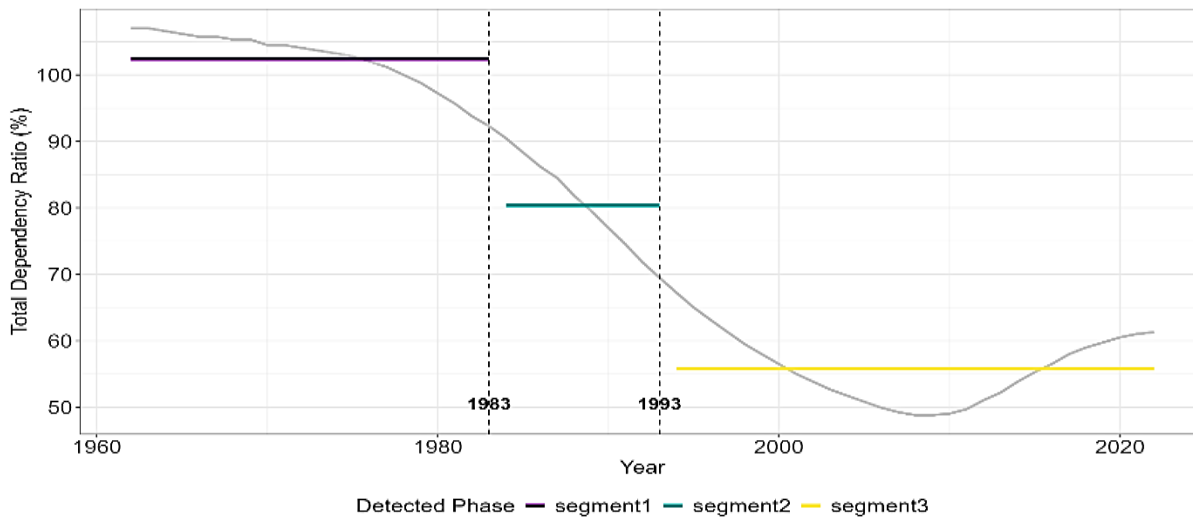


Figure 1. Algeria's Demographic Regimes Revealed by Structural Break Analysis

Table 2. Characteristics of the Identified Demographic Phases

Phase	Period	Average Dependency Ratio (%)
High-Pressure Era	1962-1983	102.4
Accelerated Transition	1984-1993	80.4
The Dividend Window	1994-2022	55.8

Source: Author's calculations, based on World

Figure 1 reveals Algeria's demographic path. The country was simply crushed by its demographic weight. Every worker was saddled with more than one dependent, a reality that made building human capital or national savings nearly impossible (Mason, 2001).

The 1983 break marks the start of Phase 2, a decade where the demographic burden plummeted. This should have been the moment of take-off. Instead, this demographic gift ran straight into the wall of economic crisis—the reverse oil shock—and political turmoil. It was a textbook case of the "rentier state" paradox (Beblawi, 1987): the right demographics arrived in exactly the wrong macroeconomic climate (World Bank, 2013).

With the 1993 break, Phase 3—the true "window of opportunity"—finally opened, offering a chance to turn population structure into prosperity (Bloom et al., 2003). But the data shows this was a fleeting chance. The recent uptick at the end of the series, a direct result of an aging population, is a stark warning: the window has already begun to close. Whether this demographic windfall can be converted into lasting wealth now depends entirely on investments in people—the one link the literature shows to be unbreakable (Lee & Mason, 2010).

4.2 A Visual Test of the Demographic Regimes

The structural breaks and distinct averages we found (Tables 1 & 2) provide a strong initial case for our three-phase model. But a truly robust analysis must go beyond averages to examine the entire distribution of the data within each phase.

For this, we use boxplots—a powerful visual method for comparing the central tendency, spread, and symmetry of different datasets. Figure 1 presents this side-by-side comparison.

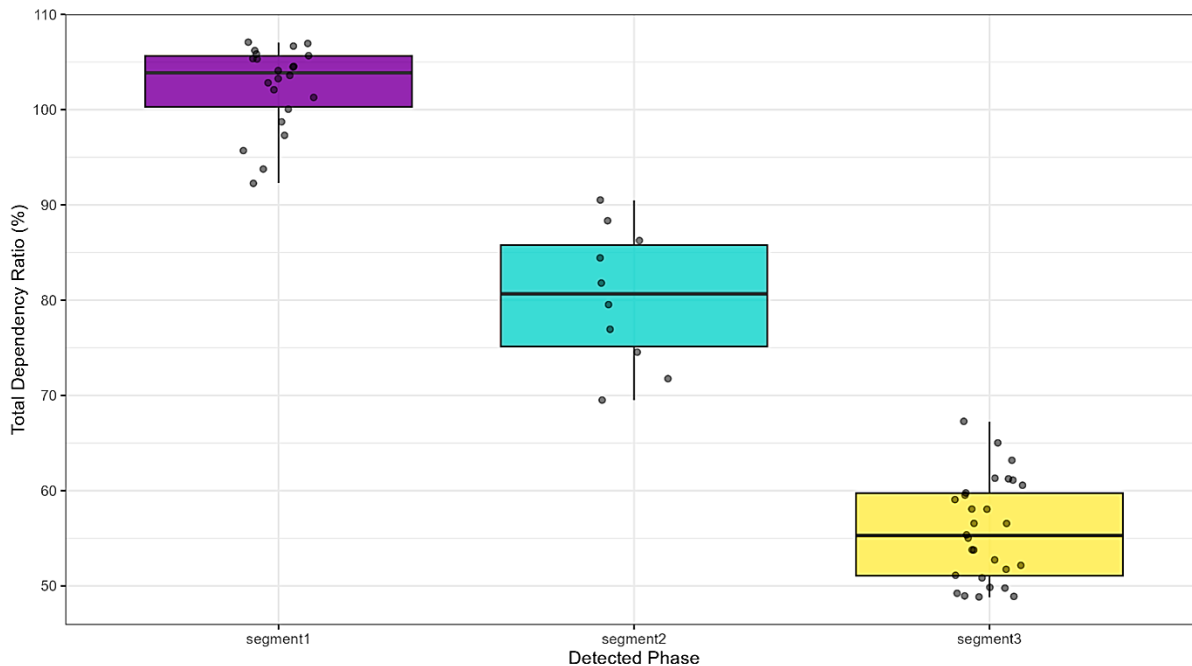


Figure 2. Distribution of the Dependency Ratio Across Detected Phases
Source: Author's calculations, based on World Bank (2023) data.

A look at Figure 2 gives a vivid confirmation of our regime breaks. We see more than just different averages; we see three periods with fundamentally distinct personalities.

The story begins with the first phase (1962–1983), which we've called "High-Pressure." This period stands out for its oppressive stability. The median dependency ratio is stuck above 100%, and as the very narrow box shows, there was almost no variation. This suggests a period of structural inertia, where society was locked into a high-fertility pattern. The demographic weight on the economy was at its maximum, and it was constant.

In stark contrast, the second phase (1984–1993), our "Accelerated Transition," is the polar opposite. The median ratio falls off a cliff, showing the transition is truly underway. Even more telling is the shape of the box: its length and the spread of the data points reveal a period of intense internal instability. This is what structural disruption looks like in the data—a decade where the old system is breaking down but nothing stable has replaced it yet.

Out of this chaotic transition emerges the third phase (1994–2022), the "Dividend Window," which shows the establishment of a new kind of stability. The dependency ratio finds a new, much lower floor, the lowest the

country has ever seen. The variance tightens again, far less than during the preceding upheaval, which indicates that a "new normal" for Algeria's demography has finally taken hold.

Table 3. Characterization and Implications of Algeria's Demographic Regimes

Regime	Timeframe	Core Demographic & Statistical Features	Prevailing Economic Dynamics
1. The High-Pressure Era	1962-1983	- Sustained dependency ratio > 100% - Overwhelming youth bulge - Low variance signaling structural inertia	- Economy oriented toward basic needs provision - Severely constrained national savings & human capital formation
2. The Volatile Transition	1984-1993	- Steep, rapid decline in dependency - High intra-period variance, indicating structural instability	- Emergence of demographic potential - Growth opportunity offset by macroeconomic headwinds (oil shock, "Black Decade")
3. The Dividend Window	1994-2022	- Dependency ratio at historic lows - Peak working-age population share - Consolidation of a new, stable regime	- Critical window for diversification & growth - Recent uptick signals the window's closure & onset of aging-related fiscal pressures

Source: Author's synthesis based on study findings.

4.3 The Shifting Impact of Growth Drivers

This section presents the results of our econometric analysis. We now formally test our central hypothesis: that the effectiveness of Algeria's growth drivers has systematically differed across the three distinct demographic regimes identified earlier (1962–1983, 1984–1993, and 1994–2022).

4.3.1 Model Specification and Diagnostic Checks

To capture these regime-dependent effects, we estimated a single linear regression model over the entire period (N=61), incorporating interaction terms between our key explanatory variables and dummy variables for each demographic phase. Phase 1 (1962–1983) serves as the baseline for comparison.

Before interpreting the coefficients, however, a series of diagnostic checks was essential to ensure the validity of our inferences and the robustness of the model (see Table 4). These steps are critical to safeguard against biased estimates or spurious conclusions.

First, we addressed the potential for autocorrelation in the residuals—a common pitfall in time-series analysis that can invalidate significance tests. A Breusch-Godfrey test up to the second order failed to reject the null hypothesis of no autocorrelation ($\chi^2(2) = 2.92$, $p = 0.232$). While reassuring, we remain cautious. The econometric literature warns that in smaller samples, such tests can lack the power to detect subtle forms of serial correlation (Greene, 2018).

Therefore, taking a conservative approach to ensure robustness, we employ Newey-West (HAC) standard errors by default. This procedure corrects both heteroskedasticity and autocorrelation, providing trustworthy standard errors for our significance tests.

We then tested the validity of our phase segmentation by performing a Wald test on the joint significance of the interaction terms. The resulting statistics ($F = 2.49$, $p = 0.035$) allows for the rejection of the null hypothesis of structural coefficient stability. This implies that the effects of the explanatory variables differ significantly across the demographic periods. This finding is central to our study, as it empirically validates the hypothesis of a structural link between demographic regimes and Algeria's economic growth mechanisms.

Table 4. Model Diagnostic Test Results

Test	Statistic	P-value	Conclusion
Breusch-Godfrey (Autocorrelation)	2.92	0.232	No autocorrelation detected
Wald (Significance of interactions)	2.49 (F)	0.035	Interactions are jointly significant
The model's overall F-statistics of 1.826 is significant at the 10% level, indicating that the set of explanatory variables significantly contributes to explaining growth.			

Source: Author's estimations using WDI data.

4.3.2 Overall Model Performance

The model yields an R-squared of 0.313 and an adjusted R-squared of 0.142. While this suggests that the model accounts for 31.3% of the variance in per capita GDP growth, this figure warrants careful interpretation. Two points are critical here. First, growth rates are inherently volatile series, making them notoriously difficult to model with high predictive accuracy. An R-squared in this range is therefore not uncommon and can be viewed as quite informative for such a variable (Achen, 1982). Second, and more importantly our analytical goal is not prediction but causal inference about structural change. The significance of the coefficients and the shifts between phases are our main concern. The Wald test already confirmed the model's success in capturing these regime changes, which is a more relevant benchmark of its utility than its overall explanatory power (Wooldridge, 2015).

4.3.3 Analysis of Regression Results

With the model's diagnostics confirmed, we can now interpret the coefficients shown in Table 5.

Table 5. Regression Results for Growth Determinants Across Regimes

Réf	Coefficient
Invest (réf: Ph1)	0.076 (0.099)
CapHum (réf: Ph1)	105.204** (45.950)
Rente (réf: Ph1)	3.636 (4.895)
Phase 2	-0.024 (0.154)
Phase 3	0.112 (0.094)

Comm	-0.066 (0.136)
Invest x Ph2	-0.186** (0.091)
Invest x Ph3	0.057 (0.167)
CapHum x Ph2	-0.987*** (0.317)
CapHum x Ph3	-0.068 (0.176)
Rente x Ph2	0.348** (0.150)
Rente x Ph3	0.037 (0.165)
Constant	1.463 (5.658)
Observations	61
R2 / R2 Adjusted	0.313 / 0.142
• Note : *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$. • In our model, Phase 1 is treated as the reference period. • Standard errors are HAC-consistent (Newey-West).	

Source: Author's estimations using WDI data.

Let's dig into what the regression results in Table 5 actually mean. They tell a story of how the fundamental drivers of Algeria's economy responded to the country's shifting demographic landscape.

A. Investment: From Insignificant to Adverse, then back to Useless

The story of investment's effectiveness is a wild ride. In Phase 1 (1962-1983), when the country was burdened by its massive youth population, investment did essentially nothing for growth. The coefficient ($\beta = 0.076$) is statistically insignificant. This fits the theory that capital spending was likely swallowed by basic social needs, not productive enterprise (Kelley & Schmidt, 1995).

Then came Phase 2 (1984-1993), and the relationship flipped on its head. The interaction term is negative and significant ($p < 0.05$), making the total effect of investment during this period negative (-0.11). It's a shocking result: in the middle of a deep crisis, more investment was linked to less growth. This points to a dysfunctional economy where capital was profoundly misallocated.

So, did the "demographic dividend" of Phase 3 (1994-2022) finally make investment matter? Not really. The negative effects from the crisis years vanished, but the impact of investment returned to being statistically indistinguishable from the first phase. This may reflect diminishing marginal returns to capital, partial infrastructure saturation, or the growing importance of institutional and structural factors such as efficiency, diversification, and governance. Thus, favorable demographics alone do not guarantee productive investment outcomes. The better demographic context seemed to stop the bleeding, but it didn't turn investment into a powerful engine for growth.

B. Human Capital: The Great Paradox

The results for human capital are perhaps the most troubling. There's a surprising twist at the beginning: in Phase 1, education had a strong and statistically significant positive effect on growth ($\beta = 105.204$, $p < 0.05$). This makes sense if you think about the enormous returns possible from creating a basic education system from a low starting point.

But that early promise was completely eroded in Phase 2. The interaction term is huge, negative, and highly significant ($p < 0.01$). This suggests a catastrophic mismatch: the country was producing more educated people just as the economy was collapsing, leaving them nowhere to go.

The most critical part of the story is that Phase 3 never fixed this. The "demographic dividend" years did not manage to make human capital a significant driver of growth again. This points to a persistent structural

problem, a classic challenge for resource-funded states where the labor market fails to value the skills of its people (Gylfason, 2001).

C. Resource Rents: The Unreliable Engine

What about oil and gas, the supposed engine of everything? Our findings show that even its power depends on the demographic context.

The impact of rents was positive but not statistically significant on its own in Phase 1. The big surprise is in Phase 2. The interaction term here is positive and significant ($p < 0.05$). What does that mean? It suggests that as every other part of the economy seized up during the crisis, growth became almost pathologically dependent on the one thing that was left: hydrocarbon revenues. Their relative importance became amplified.

When Phase 3 arrived, the relationship went back to being statistically similar to the first phase. The economy returned to its "normal" rentier state, where oil and gas were important, but not the only story the numbers told.

What all this shows, after running the necessary robustness checks, is that Algeria's demographic phases were not just time periods. They were fundamentally different economic worlds, each with its own set of rules for what it took to grow.

5. Discussion

This study set out to determine whether Algeria's demographic transition has fundamentally reconfigured the country's engine of economic growth. Moving beyond simple correlation, our approach of identifying distinct regimes and modeling their interaction with growth drivers allows us to provide clear answers to our initial research questions.

5.1. Hypothesis Validation and Theoretical Contributions

Our results first confirm our primary hypothesis (H1): Algeria's demographic transition was not a linear process. The Bai-Perron test endogenously identified two structural breaks in 1983 and 1993, which allowed us to delineate three statistically distinct demographic regimes. This finding has a significant theoretical implication: it suggests that growth models assuming stable parameters over long periods may conceal profound temporal heterogeneities, especially in countries that have undergone rapid demographic shocks.

Our second hypothesis (H2), which posited greater effectiveness for investment and human capital during the dividend phase, is only partially validated and reveals a central paradox. While investment's effectiveness did improve relative to the chaotic transition phase, its impact remained statistically weak. More strikingly, the positive contribution of human capital seen in the early period was wiped out and failed to recover. The demographic dividend thus created a potential workforce that was larger and more educated, but the economy failed to translate that potential into an effective engine for growth.

Finally, our third hypothesis (H3) regarding the heterogeneous influence of resource rents is clearly supported. The impact of rents on growth was most potent during the phase of transition and crisis. This finding reveals a mechanism of heightened dependency when other sectors of the economy falter, adding nuance to the monolithic view of the "rentier state" (Beblawi, 1987) by showing that the rent-growth relationship is itself contingent on the economic cycle and structural stability.

5.2. Answering the Research Question and Policy Implications

Our central research question was whether the relationship between the determinants of growth and economic performance was structurally altered by the phases of the demographic transition. Our Wald test confirms that the answer is a resounding yes.

The primary implication is that a demographic dividend is an opportunity, not a guarantee. The post-1994 period, despite being demographically favorable, was not sufficient to correct the structural weaknesses of the

Algerian economy. As the recent rise in the dependency ratio shows, this window of opportunity has peaked and is beginning to close. Algeria now faces a dual challenge: managing the onset of population aging while still trying to capitalize on a large youth cohort whose potential has not been fully harnessed.

6. Conclusions

For policymakers, our study highlights the urgent need to shift from policies focused on factor accumulation (more investment, more graduates) to those focused on efficiency and allocation. The critical questions are no longer just "how to invest more?" but "how to improve the business climate to make investment productive?". They are not only "how to enroll more students?" but "how to reform the education system and labor market to align skills with jobs?". Without such reforms, the dividend risks turning into a social liability (Acemoglu & Robinson, 2019).

This research, like any, has its limitations. Our model, while robust, is parsimonious. Including more refined institutional and political variables could offer a more nuanced understanding of the transmission mechanisms. Furthermore, our human capital metrics are quantitative; qualitative measures of education could reveal different dynamics.

Nevertheless, by demonstrating the existence of distinct economic regimes synchronized with the demographic transition, our paper opens several avenues for future research. A comparative analysis with other resource-rich economies that followed different demographic paths would allow for testing the generalizability of our findings.

In conclusion, this article has shown that the phases of demographic transition in Algeria were not mere chronological markers. They were distinct regimes that profoundly reshaped the mechanisms of economic growth. The demographic "gift" was only partially unwrapped, and the time to fully realize its potential is now running out.

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