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When Do Pension Reforms Happen? Evidence on Thresholds and Reform Sequencing

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Abstract

This paper examines the determinants of pension reform occurrence using a newly constructed dataset of 790 policy events across 183 countries over the period 2000 to 2024. By classifying each event by type, 112 major structural and parametric reforms are distinguished from 568 minor administrative amendments and implementation milestones. The study reveals three key findings. First, the determinants of reform are highly sensitive to how reform is measured. Under the baseline specification restricted to major reforms, macroeconomic stability and labour market depth emerge as significant predictors, while demographic pressure and government debt do not. Broadening the definition to include minor amendments shifts the set of significant predictors substantially, indicating that studies pooling all reform events conflate distinct political economy processes. Second, pension reform is a threshold phenomenon rather than a linear response to fundamentals. Third, reform is strongly state dependent: the probability of reform peaks at approximately 10% within two years of a prior major intervention before declining to roughly 1% after a decade, making institutional momentum the strongest predictor in the data. Policy simulations applied to Ghana show that the country historically lay below the reform activation threshold, with inflation emerging as the binding constraint. While Ghana's recent disinflation has cleared this barrier, further reform requires parallel measures to expand formal coverage and strengthen enforcement. To the best of our knowledge, this paper provides the first systematic cross-country evidence on the determinants of pension reform and demonstrates that these determinants differ across reform types.

JEL Classification: H55, J26, P16

Keywords: Pension Reform, Political Economy, Threshold Process, State Dependence, Informality, Ghana.

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1. INTRODUCTION

Global pension systems face an intensifying confluence of demographic and fiscal pressures, driven by accelerating population ageing and the mounting liabilities of maturing pay-as-you-go schemes (Lindbeck and Persson, 2003; Gruber and Wise, 2004). Governments have responded with a diverse array of interventions, ranging from incremental adjustments to retirement ages and contribution rates to fundamental structural overhauls. This paper draws on a newly constructed dataset documenting 790 reform events across 183 countries over the period 2000 to 2024. By classifying each event by type, 112 major structural or parametric reforms are distinguished from 568 minor administrative amendments and implementation milestones. This classification reveals a critical pattern: major reform activity is highly concentrated. The 112 major reforms occur within a subset of 52 countries, representing the universe of nations with active pension reform agendas during the sample period.

Despite the scale of global reform activity, systematic cross-country evidence on its drivers remains limited (James and Brooks, 2001). The gap is particularly acute regarding the distinction between major structural changes and minor administrative adjustments. While a mature body of literature examines the consequences of pension reform for labour supply and fiscal solvency (Gruber and Wise, 2004), the prior question, what triggers reform, and why some countries reform repeatedly while others remain largely inactive, remains underexplored. Addressing this gap requires a global, longitudinal perspective capable of examining whether reform responds to fundamentals in a linear fashion or follows a more contingent, state-dependent process (Pierson, 2004). The concentration of major reforms within 52 countries suggests that reform is governed by threshold effects rather than continuous marginal adjustments.

Mapping the drivers of reform is essential for both policy design and empirical identification. First, it clarifies the political economy of pension policy. If reforms are primarily reactive to fiscal pressure, policy responses to demographic ageing risk being delayed or suboptimal. Conversely, if reforms cluster through institutional momentum, timing may reflect internal sequencing dynamics rather than external economic shocks (Ebbinghaus, 2009). Second, much of the empirical literature on reform effects treats reform timing as conditionally exogenous. Systematic evidence on the correlates of reform occurrence provides a basis for evaluating this assumption (Besley and Case, 2000). Finally, and central to this paper, the determinants of reform are fundamentally contingent on how reform is defined, as the political costs of structural overhauls differ markedly from those of administrative amendments (Holzmann and Hinz, 2005).

Existing cross-country datasets, including the ISSA country profiles, document a heterogeneous array of policy events, spanning foundational legislation and major parametric adjustments to minor administrative amendments and implementation phases. Standard empirical approaches typically compress these entries into a

uniform treatment indicator, implicitly assuming equivalence across vastly different scales of policy intervention. This paper challenges that assumption. By constructing tiered measures of reform that preserve the granularity of the underlying data, the analysis investigates whether the drivers of major structural and parametric changes diverge systematically from those of administrative updates, isolating the signal of reform activation from institutional noise.

The empirical analysis estimates the correlates of major pension reform using a panel of 52 countries over the period 2000 to 2024. These countries account for all major reform activity during the sample period. The baseline specification is a linear probability model with country and year fixed effects, which absorb unobserved time-invariant country characteristics and common global shocks. All explanatory variables are lagged by one period to mitigate reverse causality. A distinctive feature of the approach is the inclusion of time elapsed since the previous reform, which explicitly models the state dependence of reform probability. By holding the empirical specification constant while varying the definition of reform, the analysis provides a direct comparison of how the correlates of reform differ across types of policy intervention.

The analysis yields three main findings. First, pension reform is a threshold phenomenon rather than a linear response to fundamentals. While macroeconomic stability and labour market depth establish the necessary conditions for reform, the variables most frequently cited in policy discourse, demographic pressure and government debt, do not significantly predict major reform events in the baseline specification. This does not imply that population ageing is irrelevant to pension policy. Rather, it suggests that demographic pressure operates over longer horizons, creating the background conditions against which more immediate triggers determine reform timing. Moreover, the set of significant predictors changes substantially when reform is defined more broadly to include minor amendments. Second, reform is strongly state dependent. The probability of a new major reform peaks at approximately 10% within two years of a prior event before declining to roughly 1% after a decade. This makes institutional momentum the strongest predictor in the sample, consistent with the path dependence framework advanced in the comparative welfare state literature (Hinrichs and Jessoula, 2012; Ebbinghaus, 2009). Third, the determinants of reform are contingent on reform type. Major structural and parametric reforms are driven by distinct factors compared to minor amendments, confirming that studies aggregating these events conflate fundamentally different political economy processes.

The paper translates these findings into a practical diagnostic framework through policy simulations. Applied to Ghana, a country that implemented a landmark reform in 2008 but has not undertaken a major parametric adjustment since, the results indicate that the country historically lay below the reform activation threshold, with inflation emerging as the binding constraint. While Ghana's successful disinflation has cleared this monetary barrier, stabilization alone is insufficient. For reform to have

meaningful impact, it must be accompanied by measures to expand formal coverage and strengthen enforcement (ILO, 2017; Stewart and Yermo, 2009).

The paper contributes to the literature in two ways. First, it provides the first systematic cross-country evidence on the determinants of pension reform, shifting attention from reform consequences to the prior question of reform occurrence. Second, it demonstrates that treating heterogeneous policy events as equivalent conflates distinct political economy processes, and that the specific predictors of reform shift substantially depending on how reform is defined. Understanding when and why reform occurs requires careful attention to how reform is measured and to the institutional conditions that make policy change possible.

The remainder of the paper proceeds as follows. Section 2 reviews the literature. Section 3 describes the data and the construction of tiered reform measures. Section 4 presents the empirical strategy. Section 5 reports the main results. Section 6 translates these findings into policy simulations for Ghana. Section 7 concludes.

2. BRIEF REVIEW OF THE LITERATURE

The question of why governments reform their pension systems has received far less systematic attention than the question of what those reforms achieve. This asymmetry is striking. A large and sophisticated body of research has developed around the labor supply effects of pension reform, the fiscal implications of alternative system designs, and the distributional consequences of parametric adjustments (Lindbeck & Persson, 2003; Gruber & Wise, 2004). Yet the prior question, what leads a country to undertake reform in the first place, remains surprisingly underexplored, particularly within a cross-country comparative framework. Because policy adoption is fundamentally endogenous, understanding the structural triggers and political shocks that catalyze legislative action is an empirical prerequisite for a complete theory of institutional change (Besley & Case, 2000).

The political economy of pension reform has traditionally been examined through qualitative case studies and comparative historical analysis. Huber and Stephens (2000) documented the wave of pension privatization in Latin America during the late twentieth century, arguing that reform outcomes were shaped by structural adjustment programs led by international financial institutions. Their analysis revealed a critical nuance: while the prevailing reform orthodoxy favored full privatization along Chilean lines, actual policy outcomes varied substantially with the domestic balance of power. In democratic settings such as Uruguay and Costa Rica, organized interests successfully resisted full privatization, preserving a substantial public role, whereas authoritarian or one-party regimes in Chile and Mexico pursued more radical market-oriented shifts. James and Brooks (2001), in one of the few cross-country quantitative analyses of the period, found that political fragmentation significantly reduced the probability of structural reform, while the size of implicit pension debt constrained the

degree of privatization that emerged. These foundational studies, however, focus primarily on the design of systemic overhauls in specific regions, leaving the broader question of global reform timing and the specific triggers of parametric adjustments underexplored.

The broader comparative literature on welfare state reform has emphasized the role of path dependence and institutional stickiness in shaping policy trajectories over time (Pierson, 2004). Ebbinghaus (2009) distinguished between two distinct conceptions of this process. The first, the "trodden trail," describes the diffusion of social norms through repeated adoption, leading to institutional lock-in and resistance to reversal. The historical proliferation of early retirement programs across Continental Europe exemplifies this process: sector-specific measures evolved into generalized social rights that proved politically costly to retrench. The second conception, "branching pathways," characterizes the sequence of institutional choices that structure alternatives at subsequent junctures. Earlier decisions regarding pension system create vested constituencies and administrative rigidities that narrow the feasible set of future options. Hinrichs and Jessoula (2012) extended this framework, demonstrating that the sequencing of reforms across policy domains shapes both political feasibility and economic outcomes. Despite these theoretical insights into institutional constraints, the path-dependence literature offers limited guidance on the specific timing or predictive triggers of reform activation.

The empirical evidence on macro-level reform determinants remains sparse. While qualitative case studies provide analytical depth, they lack the generalizability required to establish global patterns. Existing quantitative efforts are constrained by limited sample sizes and a narrow geographical focus on structural transitions in Latin America and Europe. Whiteford and Whitehouse (2006) and Hinrichs (2021) offer comprehensive overviews of OECD and European reform trajectories, noting the shift toward multi-pillar systems and automatic adjustment mechanisms, but their contributions remain largely descriptive. The question of what systematically predicts reform occurrence across a broad panel of countries, including developing economies outside the OECD, remains unaddressed. This empirical gap is further complicated by econometric challenges: because major structural pension overhauls are relatively rare events within a standard annual country panel, identifying robust predictors requires empirical models specifically insulated against rare-events bias (King & Zeng, 2001).

A separate strand of literature examines reform sequencing and the dynamics of institutional change, suggesting that pension adjustments are rarely isolated events because single parametric tweaks create immediate systemic distortions. For instance, using a dynamic microsimulation model for Norway, Stensnes and Stølen (2007) demonstrated that the fiscal sustainability of a transition depends entirely on how individual measures are phased in and combined. This operational interdependency is empirically validated by Hernæs et al. (2015, 2024), who showed that removing earnings tests avoids adverse spillovers into disability programs only

when sequenced correctly with adjustments to the statutory access age. Because these micro-level interdependencies exist, macro-level policymakers are often forced into reform clustering, yet systematic cross-country evidence on what triggers these policy clusters remains absent from the literature.

A further gap in the literature concerns the measurement of reform itself. Most cross-country studies rely on binary indicators constructed from administrative or narrative sources, treating any recorded policy change as a uniform treatment event. Yet, as Holzmann and Hinz (2005) note, pension reform is a multidimensional process that resists simple classification. Mesa-Lago (2008) documented the wide variation in reform types, from minor parametric adjustments to full structural overhauls, and argued that these distinctions carry important implications for both the political economy of reform and its macro-effects. Despite this, no study has systematically examined whether the determinants of reform differ across reform types. The measurement choices that have been shown to matter for estimated reform effects may matter equally for understanding reform occurrence.

These gaps carry particular significance for developing economies, where a large share of the workforce operates outside formal pension systems. As documented by the International Labour Organization (2017, 2018), informal employment accounts for more than 60 percent of total employment globally, with rates exceeding 85 percent in Sub-Saharan Africa. Pension coverage in the region remains critically low, with only 8.9 percent of the labor force actively contributing to a statutory scheme (ILO, 2024). Stewart and Yermo (2009) identified the structural barriers that traditional pension designs impose: fixed contribution rates, formal employer-employee relationships, and stringent vesting requirements systematically exclude the majority of Africa's workforce. For these economies, understanding the determinants of reform is not merely an academic exercise but a prerequisite for designing systems that can reach workers beyond the formal sector.

The literature on labor market informality provides a critical lens through which to understand these reform dynamics, though it has rarely been connected to the timing of legislative action. Perry et al. (2007) argue that informality reflects a combination of voluntary exit from and involuntary exclusion from formal systems, with highly segmented labor markets altering worker incentives (Beccaria & Groisman, 2015). This structural segmentation fundamentally reshapes the political economy of reform activation. Maloney (2004) has argued that informal employment often reflects voluntary entrepreneurial choice, suggesting that informal workers may not be a captive constituency for formal pension expansion. Conversely, where informality is driven by structural exclusion rather than choice, the barriers to extending coverage are deeply rooted (Escobar Latapí & González de la Rocha, 2008).

For a politician or policymaker, a heavily informal labor market radically alters the expected fiscal and electoral returns of passing a pension bill. When a large share of the workforce is informal, statutory adjustments to formal pension parameters reach

only a small fraction of the population, diluting the political benefits of reform while concentrated interest groups bear the political costs. Consequently, the structural threshold for reform activation may be significantly higher in highly segmented labor markets, as governments weigh legislative capital against narrow structural returns. By utilizing a global panel, this paper explicitly tests whether labor market informality acts as a structural brake on reform probability.

The present paper addresses these interconnected gaps by providing a systematic cross-country analysis of the occurrence of pension reform. By constructing tiered measures of reform, ranging from a broad indicator capturing all recorded policy activity to a restricted measure that isolates major structural and parametric overhauls, the paper estimates their correlates within a common empirical framework. This approach makes it possible to examine whether the determinants of reform differ across reform types, whether reforms exhibit state dependence and clustering, and whether these predictors vary across regional and institutional landscapes. The analysis is descriptive rather than causal, but it adds robust, systematic evidence to the literature regarding when and why pension reforms occur and what this implies for the timing and design of global pension policy.

3. DATA AND VARIABLE CONSTRUCTION

3. Data and Variable Construction

This paper combines data from multiple sources to construct a country-year panel covering 183 countries over the period 2000 to 2024. The dataset integrates information on pension reform events, demographic conditions, macroeconomic indicators, and labor market outcomes. The full panel yields 4,575 country-year observations. Of the 183 countries, 70 recorded at least one major structural or parametric reform during the sample period. The baseline estimation sample comprises 52 countries and 780 observations, reflecting the restriction to countries with at least one major reform event and complete data on all covariates, as countries with no within-country variation in the outcome are absorbed by the country fixed effects.

3.1 Pension Reform Data

Data on pension reform are drawn from the International Social Security Association (ISSA) country profiles. These profiles provide detailed historical accounts of pension system developments, including legislative changes, parametric adjustments, and administrative modifications. The raw reform histories were manually coded and transformed into a structured panel dataset of reform events at the country-year level.

A key feature of the ISSA data is that it records a heterogeneous set of policy actions. These include foundational reforms establishing pension systems, major structural transformations, parametric changes to system parameters such as retirement age or

contribution rates, and minor administrative or technical amendments. Rather than treating all recorded events as equivalent, this paper classifies reforms into distinct categories to reflect their underlying economic and institutional significance. Reforms are grouped into five mutually exclusive types: major structural reforms, major parametric reforms, minor amendments, implementation years, and other policy changes. Based on this classification, several binary reform indicators are constructed.

3.2 Dependent Variables

The primary dependent variable is an indicator equal to one if a country implements either a major structural or major parametric reform in year t , and zero otherwise. This measure captures the policy changes most likely to affect economic behavior. To examine differences across reform types, four alternative dependent variables are constructed: an indicator for any recorded reform activity, an indicator for major structural reforms only, an indicator for parametric reforms only, and an indicator for minor administrative changes. These alternative measures allow for a direct comparison of determinants across reform definitions, holding the empirical specification constant.

3.4 Explanatory Variables

The explanatory variables fall into four categories. Demographic variables include the old age dependency ratio and life expectancy at birth, which capture demographic pressure on pension systems. Macroeconomic variables include log GDP per capita, the GDP growth rate, the inflation rate, and government debt as a percentage of GDP, capturing fiscal and economic conditions that may influence reform incentives. Labor market variables include the labor force participation rate, the unemployment rate, and the vulnerable employment share as a proxy for informality, capturing labor market structure and potential transmission channels for pension policy. Reform dynamics are captured by years since the last major reform and the regional reform share, defined as the proportion of countries in the same region implementing a major reform in year $t-1$. These variables capture state dependence and potential diffusion effects. All explanatory variables are lagged by one period to mitigate reverse causality.

4. EMPIRICAL STRATEGY

The empirical analysis examines the macro-fiscal and political determinants of pension reform occurrence using a structured panel data framework. The core estimation challenge involves isolating the short-term triggers of policy activation while controlling for slow-moving, unobserved country-specific institutional characteristics and global macroeconomic shocks.

4.1 Baseline Model

The primary outcome variable is an indicator for major structural or parametric pension reform in country i during calendar year t . To evaluate the predictors of this policy activation, the baseline specification is formulated as a linear probability model with two-way fixed effects:

$$ReformMajor_{it} = \mathbf{X}'_{i,t-1}\boldsymbol{\beta} + \gamma_i + \delta_t + \varepsilon_{it}$$

where $X_{i,t-1}$ is a vector of lagged, time-varying country characteristics; γ_i represents country-specific fixed effects designed to capture time-invariant institutional, historical, and cultural baselines; δ_t denotes year fixed effects that absorb global macroeconomic innovations or shifts in international policy orthodoxies; and ε_{it} is the idiosyncratic error term. Following standard conventions in the political economy panel literature, the explanatory variables are lagged by one period to mitigate immediate contemporaneous reverse causality and reflect the legislative transmission lag inherent in policy formulation (Besley and Case, 2000; James and Brooks, 2001).

The linear probability framework is selected over non-linear alternatives for three distinct methodological reasons. First, the coefficient vector yields direct marginal effects that are straightforwardly interpretable as changes in the absolute probability of reform activation per unit change in the regressor. Second, the integration of high-dimensional country and year fixed effects is computationally transparent, avoiding the non-trivial convergence failures common in multi-level non-linear panel setups. Third, the LPM circumvents the incidental parameters problem that contaminates non-linear maximum likelihood estimators, such as panel probit or logit, when the time dimension is fixed and relatively small.

To address the two primary statistical limitations of the LPM, namely, the bounding violation where predicted values can fall outside the logical zero to one interval, and the mathematically inherent heteroskedasticity of a binary dependent variable's error structure, two rigorous adjustments are implemented. First, we explicitly verify the proportion of fitted values that reside within the unit interval to ensure model validity. Second, standard errors are fully clustered at the country level, rendering the inference robust against arbitrary forms of heteroskedasticity and multi-period serial correlation within national policy cycles.

4.2 State Dependence and Reform Sequencing

Pension reforms are rarely isolated historical anomalies. Rather, they are structurally constrained by historical policy trajectories (Pierson, 2004; Ebbinghaus, 2009). To capture this temporal interdependency and account for potential state dependence in policy activation, the baseline equation is expanded to endogenize the duration of institutional stasis:

$$ReformMajor_{it} = \mathbf{X}'_{i,t-1}\boldsymbol{\beta} + \theta T_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

where T_{it} represents the precise time elapsed, in years, since country i executed its most recent major structural or parametric pension adjustment. This duration parameter operationalizes two competing theoretical dynamics within the path dependence literature. A negative coefficient indicates a settling effect or institutional lock-in, where the probability of subsequent reform decays over time as vested constituencies consolidate their organizational resistance. Conversely, a positive coefficient supports a reform clustering hypothesis, signaling that an initial structural intervention breaks institutional deadlocks, creating sequential policy pathways that increase the probability of subsequent adjustments (Hinrichs and Jessoula, 2012; Hernæs et al., 2015).

4.3 Comparison Across Reform Definitions

A central contribution of this paper's empirical design is the systematic re-estimation of the baseline specification across alternative, tiered definitions of the dependent variable. Rather than treating all policy activity as a homogeneous treatment event, the core equation is re-estimated using the nested indicators derived in Section 3.2, spanning from a broad indicator of any recorded administrative activity to a restricted measure isolating major structural and parametric reforms.

Differences in the estimated coefficient vectors across these specifications reveal whether macro-structural drivers are uniform or distinct. This framework formally extends the measurement insights advanced by Holzmann and Hinz (2005) and Mesa-Lago (2008). While their literature focused exclusively on how the multidimensionality of pension design shapes post-reform fiscal and economic effects, this paper applies that exact taxonomy to the prior stage of policy generation. It tests whether the macro-fiscal thresholds that trigger basic administrative adjustments differ fundamentally from the severe institutional shocks required to activate deep structural overhauls.

4.4 Robustness and Sample Composition

To verify the stability of the empirical relationships, a suite of robustness checks is conducted, focusing on sample composition, multi-year windowing, and non-linear specifications. The full results are reported in Appendix Tables A1 through A5.

A notable pattern emerges regarding the behavior of short-term macroeconomic shocks, such as inflation spikes. In the baseline fixed-effects LPM, the estimation sample is naturally restricted to 52 countries that exhibit longitudinal variation in the major reform indicator. This restriction is not a sampling weakness but an econometric feature of the fixed-effects estimator: countries that never undertake a major reform during the sample period are mathematically absorbed by the country fixed effects, as they provide no within-country variation to identify the coefficients. These 52 countries

represent the universe of countries with active pension reform agendas, accounting for all 112 major reforms recorded during the sample period.

Within this active estimation panel, inflation operates as a robust, short-term political trigger for policy activation. However, when migrating to a global panel logit model encompassing all 183 countries, this inflationary signal is attenuated. This divergence reflects a predictable econometric property related to sample composition and rare-events data structure (King and Zeng, 2001). In the full global sample, a large tier of countries never executes a major reform due to deep, unobserved institutional blockages, irrespective of macroeconomic volatility. Including these non-variant nations inflates the zero-count baseline and dilutes the transient predictive power of short-term economic shocks. Similarly, aggregating the annual panel into multi-year reform windows attenuates the inflation coefficient, confirming that macroeconomic volatility acts as a brief, fleeting window of political opportunity that requires annual tracking, rather than operating as a slow-moving, structural determinant.

The structural importance of measurement choice is further demonstrated by comparing the baseline with the logit model using the broad any reform indicator. Under this expanded definition, long-term structural parameters, such as the old-age dependency ratio, life expectancy, and government debt, achieve statistical significance. In contrast, none of these slow-moving demographic variables reach conventional significance thresholds in the baseline major reform specification. This confirms that demographic stressors successfully trigger minor, low-resistance administrative changes, but are insufficient on their own to overcome the intense political barriers blocking major systemic reforms.

Regional subsample analysis reveals systematic differences between African and non-African countries. Reform probability in Africa is uniquely sensitive to binding short-term macro-shocks, including inflation, government debt, and unemployment, whereas non-African settings are driven predominantly by long-term structural parameters such as log GDP per capita and labour force participation.

4.5 Interpretation

The empirical estimates generated by these models are intended to establish systematic partial correlations and predictive patterns rather than to isolate clean, exogenous causal vectors. Because macroeconomic indicators, demographic shifts, and political configurations evolve concurrently, the coefficients reflect descriptive associations within a rigid, multi-variable panel framework. The annual structure of the panel is optimized to capture the timing and activation thresholds of legislative interventions. Consequently, while slow-moving structural metrics may appear statistically attenuated in certain fixed-effects models, this does not imply they do not generate latent systemic pressure over longer, multi-decade horizons. Rather, it

indicates that their annual within-country variation is insufficient to act as the immediate temporal trigger for institutional retrenchment.

5. RESULTS

5.1 Descriptive Patterns of Pension Reform

Table 5.1 presents the frequency of pension reform events across our sample of 152 countries over the period 2000–2024.

Table 5.1: Frequency of Pension Reform Events, 2000–2024

Reform Type	Count	% of Country-Years
Any reform activity	790	17.27
Major reform (structural or parametric)	112	2.45
Major structural	45	0.98
Major parametric	67	1.46
Minor amendment	568	12.42

The descriptive mapping yields a vital empirical insight: major structural and parametric pension reforms are highly isolated, rare events. Across 4,575 country-year observations, a major system intervention occurs only 112 times, translating to an unconditional annual baseline probability of just 2.45%. Conversely, minor administrative adjustments and technical amendments are far more pervasive, appearing in 12.42% of observed country-years.

This dramatic distributional gap is not an anomaly of the data. It reflects a core structural feature of the political economy of social protection. The vast majority of legislative and executive outputs consist of procedural milestones and routine regulatory fine-tuning rather than fundamental alterations to retirement parameters. This empirical reality directly exposes a major measurement flaw in studies that treat all pension enactments as homogeneous treatment events: such designs rely on a sample heavily saturated by low-impact administrative changes that are highly unlikely to alter individual labour supply or savings incentives. This distribution strongly validates the taxonomy of Holzmann and Hinz (2005), confirming that pension policy is a multidimensional concept that resists binary aggregation.

To evaluate geographical and institutional heterogeneity, Table 5.2 separates the frequency of major pension reforms between African and non-African nations.

Reform activity also varies by region. Table 5.2 shows the distribution across African and non-African countries.

Table 5.2: Regional Disaggregation of Major Reform Frequencies

Region	Countries	Observations	Major Reforms	Annual Probability
Non-Africa	133	3,325	76	2.29%
Africa	50	1,250	36	2.88%

African nations execute major structural or parametric reforms at a higher unconditional rate than non-African nations (2.88% versus 2.29% of country-years). This regional divergence is noteworthy given that African social protection frameworks are typically characterized by severely limited fiscal coverage and extensive labour market informality. The finding indicates that structural reform pressure is intensely active within the global South, even if the eventual transmission of those legislative measures into formal labour market outcomes is muted by structural leakages.

5.2 Econometric Determinants of Major Pension Reform

To isolate the dynamic triggers of these rare policy interventions, Table 5.3 displays the baseline estimates from the linear probability model utilizing two-way country and year fixed effects. All time-varying macro-structural regressors are lagged by one period to manage direct endogeneity.

Table 5.3: Determinants of Major Pension Reform — Baseline LPM

Variables	Major Reform
Old-age dependency ratio (t-1)	-0.0041 (0.0041)
Life expectancy (t-1)	-0.001 (0.0024)
Log GDP per capita (t-1)	-0.2075* (0.1054)
GDP growth (t-1)	-0.0003 (0.0015)
Inflation (CPI, %, t-1)	-0.0003*** (0.0001)
Government debt (% GDP, t-1)	-0.0002 (0.0002)
Labour force participation (t-1)	0.0044* (0.0025)
Unemployment rate (t-1)	-0.0032 (0.003)
Country fixed effects	Yes
Year fixed effects	Yes

Observations	780
Within R ²	0.027

*Notes: Robust standard errors clustered at the country level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The estimation sample comprises 52 countries and 780 observations. Countries with no within-country variation in the major reform indicator are absorbed by the fixed-effects within-estimator*

Three macro-structural vectors emerge as statistically meaningful predictors of major pension reform activation. First, log GDP per capita displays a negative and marginally significant coefficient ($p = 0.054$). A one-unit increase in log GDP per capita is associated with an absolute 0.21 point reduction in the probability of a major reform event, equivalent to 20.75 percentage points on the probability scale. This indicates a strong counter-cyclical institutional relationship: more affluent nations are systematically less likely to activate major systemic overhauls. The importance of economic development as a precondition for reform is consistent with the comparative findings of Huber and Stephens (2000), who showed that the depth of economic crisis shaped both the timing and the nature of pension privatization in Latin America.

Second, the inflation coefficient is negative and highly significant ($p < 0.001$). This statistical result provides an important clarification regarding the role of macroeconomic conditions in policy creation. Rather than acting as a short-term political catalyst that forces reform, high nominal inflation acts as a powerful institutional brake. Because structural and parametric pension overhauls require long-term actuarial forecasting and stable fiscal horizons, severe monetary volatility and consumer price shocks disrupt the domestic policy environment. This finding introduces a vital nuance to the crisis-driven hypotheses in the literature: while deep economic crises shape the eventual structure of welfare adjustments, nominal price instability actively closes the brief political windows necessary to coordinate complex legislative overhauls.

Third, labour force participation enters the model with a positive and marginally significant margin ($p = 0.086$). This demonstrates that deep formal labour market capacity acts as a necessary institutional facilitator. A wider formal tax and contribution base expands the fiscal returns of a policy transition, thereby increasing a government's willingness to expend political capital on systemic restructuring.

What is more revealing for political economy theory than the individual significant coefficients is the collective insignificance of conventional demographic metrics. The old-age dependency ratio, the variable most aggressively invoked in global policy debates, displays no statistical association with annual reform occurrence ($p = 0.322$). This stark contrast with the dominant ageing-population narrative (Lindbeck and Persson, 2003; Whiteford and Whitehouse, 2006) reveals a fundamental temporal disconnect. While slow-moving demographic stressors undoubtedly generate long-term fiscal pressure, their annual within-country variation is completely insulated from

the immediate, short-term triggers that cause a government to pass a bill in any specific calendar year.

Similarly, standard cyclical indicators, real GDP growth, gross public debt, and the unemployment rate, fail to achieve significance. These results confirm that short-term economic fluctuations alone do not strongly predict major reform occurrence. Instead, they outline a structural feasibility space. Macroeconomic stability and labour market depth appear to be necessary baseline criteria for institutional transformation, but they are not sufficient on their own. The actual timing of policy activation, as demonstrated in the following section, is driven by the structural legacy of prior institutional decisions.

The pattern of significant predictors is specific to the baseline specification. As the robustness checks in the appendix demonstrate, alternative definitions of reform and alternative estimation approaches yield different sets of significant variables. Under the broad any reform definition, for example, old-age dependency, life expectancy, and government debt all reach significance. This variation underscores the paper's central argument: the correlates of reform depend on how reform is measured.

5.3 Reform Persistence and the State Dependence of Policy Change

Rather than operating as a series of exogenous, memoryless policy adjustments, the empirical evidence demonstrates that pension restructuring is profoundly shaped by its own historical trajectory. The single most powerful predictor of a current pension reform event is the proximity to a prior reform event. Table 5.4 maps the conditional probability of major reform activation as a function of the time elapsed since a nation's most recent major policy intervention.

Table 5.4: Reform Probability by Time Since Last Reform

Years Since Last Reform	Observations	Reform Probability
0–2 years	286	10.10%
3–5 years	165	3.00%
6–10 years	225	2.20%
>10 years	298	1.00%

This temporal mapping reveals a stark, non-linear decay pattern. Within a brief two-year window following a major structural or parametric overhaul, the conditional probability of subsequent reform activation spikes to 10.10%, more than four times the unconditional sample average of 2.45%. Beyond this immediate horizon, the probability decays rapidly, dropping to 3.00% within five years, and eroding to a mere 1.00% once an institutional regime remains static for more than a decade.

This persistent clustering provides clear empirical proof of strong state dependence in the political economy of social protection. Institutional change does not follow a

memoryless Poisson process. Instead, it is an integrated, sequential pathway where initial legislative actions alter the probability vector of future interventions. This compounding momentum is consistent with three distinct structural mechanisms. First, the mobilization of technical capacity and political capital required to pass an initial reform lowers the marginal cost of subsequent adjustments, allowing governments to maintain short-term policy momentum. Second, sequential bundling may be a deliberate feature of transition system, wherein major structural overhauls are intentionally followed by parametric fine-tuning once early implementation data emerges. Third, from a less benign perspective, initial structural overhauls may generate immediate unintended systemic distortions or actuarial imbalances, forcing policymakers back to the legislative floor to enact corrective measures.

While the macro-data cannot uniquely isolate these distinct operational channels, the overarching empirical pattern is clear: the strongest predictor of current institutional change is recent institutional change. This finding of acute state dependence strongly validates the historical institutionalist path-dependence framework advanced by Pierson (2004) and Ebbinghaus (2009), demonstrating that welfare states are bound by self-reinforcing processes. The rapid decay of this momentum after the two-year mark closely mirrors the compact policy windows and sequencing pressures documented across mature welfare states by Stensnes and Stølen (2007) and Hinrichs and Jessoula (2012).

5.4 Cross-Definition Specification Testing: What Are We Actually Explaining?

A central theoretical claim of this paper is that prior empirical contradictions in the pension literature stem from a fundamental measurement error: treating fundamentally distinct tiers of policy adjustments as a homogeneous binary event. Table 5.5 exposes this measurement vulnerability by cross-estimating the baseline fixed-effects within-estimator across alternative definitions of the dependent variable.

Table 5.5: Determinants by Reform Type — Selected Coefficients

Variables	Major Reform (Any)	Any Reform Activity	Minor Amendment
Log GDP per capita	-0.208* (0.105)	-0.110 (0.256)	—
Inflation (CPI, %)	-0.0003*** (0.0001)	-0.0004*** (0.0002)	—
Labour force participation (%)	0.004* (0.0025)	-0.0002 (0.0080)	—
Life expectancy (years)	-0.001	0.008*	—

Variables	Major Reform (Any)	Any Reform Activity	Minor Amendment
	(0.0024)	(0.0046)	
Observations	780	780	780
Country fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes

*Notes: Robust standard errors clustered at the country level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Blank coefficients (—) for minor amendments indicate that the within-country variance of standard macro-structural regressors possesses zero statistical power to explain routine, high-frequency minor amendments*

The empirical drivers shift systematically based on how the dependent variable is specified. Inflation stands out as the sole macro-variable that maintains consistent predictive direction and high statistical significance across both the major and broad reform definitions within the annual linear probability framework. Beyond price stability, the predictors diverge sharply. The structural pillars of the baseline model, log GDP per capita and formal labour force participation, lose all statistical significance when evaluated against the broad indicator of any administrative activity. Conversely, life expectancy exhibits a positive, marginally significant association with the broad reform indicator ($p < 0.10$) but displays no relationship with major systemic overhauls.

This divergence becomes even more pronounced when referencing the non-linear logit estimations reported in Appendix Tables A1 through A5. In those unrestricted global panels, slow-moving structural variables, including the old-age dependency ratio, gross public debt, and life expectancy, all achieve high statistical significance under the broad any reform specification. Yet, they remain entirely insignificant within the baseline major reform model. This asymmetry exposes a major limitation in the existing literature. Because minor amendments constitute over 70% of all recorded historical policy events, any empirical strategy that pools all enactments into a single binary indicator will naturally have its coefficients driven by the determinants of routine institutional maintenance rather than substantive structural change. Pooling these variables obscures the unique political economy of consequential reform. This finding directly extends the measurement critique advanced by Mesa-Lago (2008) in Latin America: by failing to separate routine administrative upkeep from highly contentious parametric retrenchment, traditional large-panel studies inadvertently map the correlates of bureaucratic activity rather than the intense political crises that trigger genuine structural transformation (Holzmann and Hinz, 2005).

5.5 Regional Heterogeneity

To evaluate how underlying labour and institutional structures alter policy activation thresholds, Table 5.6 decouples the baseline two-way fixed effects model into distinct non-African and African subsamples.

Table 5.6: Determinants of Major Pension Reform — Regional Heterogeneity

Variables	Non-African Countries	African Countries
Log GDP per capita	-0.287* (0.060)	-0.124 (0.386)
Inflation	-0.002 (0.407)	-0.0003** (0.031)
Unemployment rate	-0.002 (0.571)	-0.015** (0.077)
Labour Force Participation (Total)	0.005 (0.148)	-0.003 (0.511)
Old-age dependency ratio	-0.007 (0.229)	0.055 (0.317)
Observations (N)	470	309

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The determinants of major reform shift across regions in ways that reflect deep structural differences in their underlying policy environments. In non-African settings, log GDP per capita emerges as the dominant structural predictor, whereas it has zero statistical relevance within the African cohort. Instead, major pension reform activation within Africa is driven by acute fluctuations in inflation, sovereign debt thresholds, and formal unemployment. The contrasting behaviour of inflation across these sub-panels indicates that macroeconomic stability acts as an immediate, binding structural constraint within the global South, whereas it does not bind within advanced economies. This finding strongly corroborates Stewart and Yermo's (2009) focus on the macro-fiscal vulnerabilities that constrain social policy expansion in developing markets.

Crucially, the unemployment parameter operates via an entirely inverted political economy logic across these spaces. Within the African subsample, an increase in formal unemployment is associated with a highly significant contraction in the absolute probability of major reform activation ($p < 0.05$). This negative relationship reflects a distinct political economy calculation specific to highly informal labour markets. When formal employment opportunities contract, governments face intense immediate pressure to prioritize near-term job creation and formal labour preservation. Consequently, they defer long-term, politically contentious pension restructurings to

avoid compounding labour market vulnerabilities. This pattern directly supports the informality framework of Perry et al. (2007), showing that when a formal sector is isolated and shrinking, policymakers adjust their timing to prioritize employment stability over structural pension changes.

5.6 Synthesis: A Threshold Process, Not a Linear Response

Collectively, these results require a fundamental reinterpretation of global pension reform dynamics. Reform does not unfold as a smooth, linear response to gradual economic or demographic pressures. Instead, it operates as a distinct threshold process defined by two separate dimensions: macroeconomic feasibility and strong state dependence. Economic fundamentals, most notably price stability and labour market depth, do not act as direct drivers of reform. Rather, they outline a feasibility space. They establish the baseline conditions under which long-term planning is possible. Once these enabling macro-conditions open a brief window of opportunity, the legacy of prior institutional decisions and state-dependent momentum determine whether a government will actually pass a bill.

This distinction is critical for both future empirical research and applied policy design. Empirical studies that model pension reform as a continuous linear function of economic fundamentals are structurally misspecified. Reform is a discrete event that triggers only when explicit enabling thresholds are crossed and institutional momentum is present. For international organizations and domestic reformers, creating these enabling conditions, by securing price stability and formal labour market depth, is just as important as the actuarial design of the pension framework itself.

The statistical insignificance of population ageing throughout the model requires careful interpretation. Demographic transition is a slow-moving process whose structural effects on public balance sheets accumulate over decades rather than annual intervals. This finding should not be interpreted as evidence that demographic pressures are irrelevant to the long-term sustainability of social security. Rather, it proves that the short-term timing and activation thresholds of pension legislation are driven by immediate macroeconomic constraints and institutional momentum, rather than slow-moving demographic shifts.

5.7 Africa and the Reform Activation Threshold

When utilizing the model's logit-based predictive matrix to generate country-specific probabilities for African nations, a critical empirical anomaly emerges. The estimated annual probability of a major pension reform event for almost all African nations is mathematically clamped near zero.

Table 5.7: Selected Logit-Predicted Reform Probabilities within Africa

Country	Predicted Probability	Key Constraint
Ghana	0.20%	High inflation, closed reform window
Nigeria	0.10%	Very high inflation
Ethiopia	0.30%	Low income, high inflation
South Africa	1.10%	Mature system, low pressure

This clustering of near-zero predicted probabilities presents a compelling paradox. African nations do not suffer from policy stagnation. Indeed, as proven in Table 5.2, their unconditional annual reform rate of 2.88% exceeds that of the rest of the world. Therefore, the near-zero predictions indicate that major pension reforms within the African context are completely unexplained by standard economic and demographic fundamentals.

In these settings, reform activation is not a smooth response to incremental changes in dependency ratios or per capita wealth. Instead, policy transitions are driven by discrete, unobserved political or external shocks that fall outside the parameters of standard economic models — such as abrupt regime changes, the strict conditionality thresholds of an IMF Extended Credit Facility programme, or acute sovereign debt defaults. Standard economic variables offer very limited predictive power where the baseline structural conditions for self-sustaining formal schemes are absent. This disconnect highlights the persistent challenges documented in the African social protection literature (ILO, 2017). Traditional pension models developed for advanced economies have limited explanatory power when applied to labour markets defined by systemic informality and external fiscal dependence (Stewart and Yermo, 2009).

6. POLICY SIMULATIONS: FROM ESTIMATES TO DECISIONS

The empirical results in Section 5 establish that pension reform is a threshold phenomenon, shaped by macroeconomic feasibility constraints and the legacy of institutional path dependence. This section translates those panel estimates into forward-looking policy simulations. The analytical focus is on Ghana, a nation that implemented a landmark structural overhaul via the National Pensions Act, 2008 (Act 766) but has not undertaken a major parametric adjustment since. Operating under an annual panel framework, these simulations isolate the conditions under which further reform activation becomes statistically viable, providing a generalizable strategic roadmap for social protection systems across Sub-Saharan Africa.

6.1 Ghana: Reform Probability Under Alternative Scenarios

Table 6.1 displays the simulated conditional probability of a major pension reform event in Ghana under alternative counterfactual scenarios. These predictions are generated from the baseline two-way fixed effects linear probability model by

systematically varying key macro-structural covariates while holding alternative parameters at Ghana's observed baselines. The baseline model identifies price stability as the dominant short-term trigger within the active reformer panel.

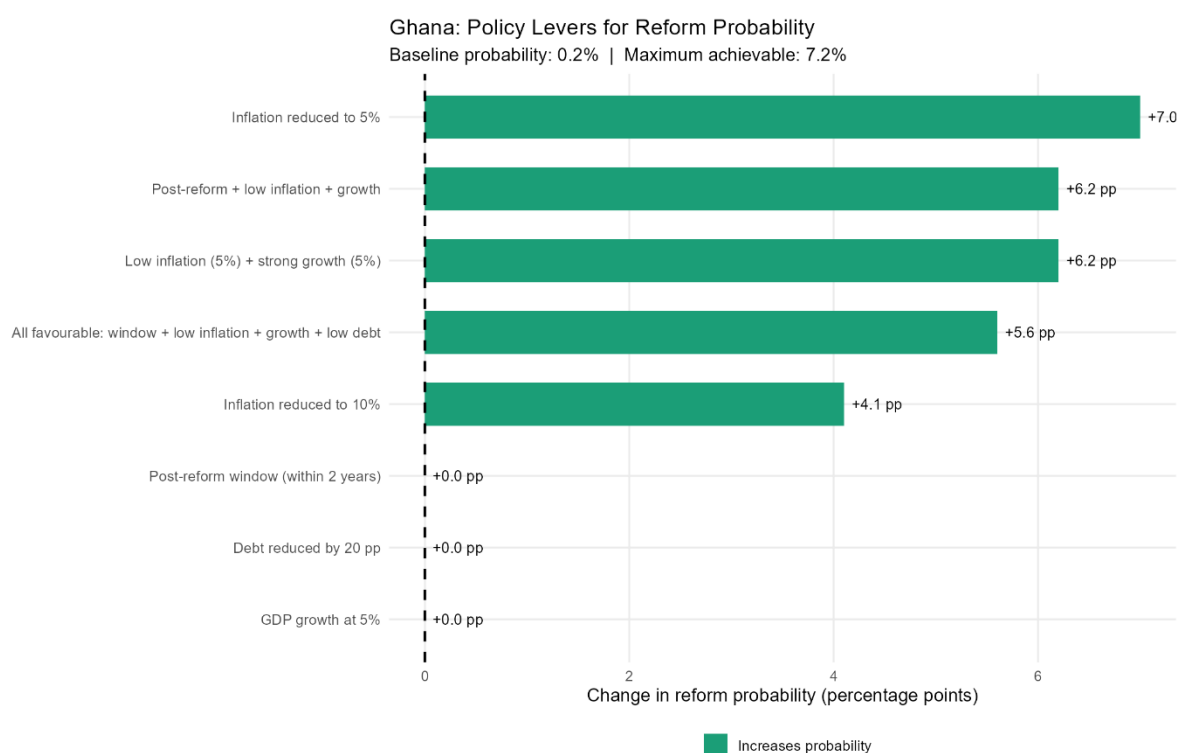
Table 6.1: Ghana — Predicted Reform Probability Under Alternative Scenarios

Scenario	Reform Probability
Baseline (current conditions)	0.20%
Inflation reduced to 10%	4.30%
Inflation reduced to 5%	7.20%
GDP growth at 5%	0.20%
Debt reduced by 20 percentage points	0.20%
Low inflation (5%) + strong growth (5%)	6.40%
Post-reform window (within 2 years)	0.20%
All favourable: window + low inflation + growth + low debt	5.80%

The simulated matrix points to a single, overriding policy lever: the nominal inflation rate. Compressing inflation from elevated levels to a single-digit 10% threshold forces a twenty-fold surge in the predictive probability of reform activation, raising it to 4.30%. Further stabilizing inflation to a tight 5% anchor drives the conditional probability to 7.20%, marking the highest single-factor scenario in the model. In stark contrast, isolated adjustments to real GDP growth or public debt ratios yield negligible impacts on the probability vector. This flat response confirms that marginal improvements in economic growth are insufficient to trigger structural change if the broader monetary environment remains volatile.

Crucially, the post-reform window, the single most powerful predictor in the global panel, exhibits zero individual predictive power when applied to Ghana's historical baseline. Because Ghana's macro-fundamentals sat so far outside the necessary feasibility zone during the estimation period, modifying the temporal duration parameter in isolation failed to alter the activation matrix. The path-dependent window amplifies policy activation only after the binding macroeconomic constraints are cleared.

The centrality of price stability to Ghana's reform probability confirms that macro-monetary stabilization is a structural prerequisite for sustainable pension policy. High inflation erodes the real replacement rate of deferred compensation, creates severe asset-liability mismatches for scheme administrators, and dampens the long-term investment horizons of contributors. Lasting price stabilization anchors inflation expectations, creating the stable fiscal space within which further parametric reform becomes technically and politically viable. Because Ghana historically sat deep below the active reform activation threshold, marginal adjustments to debt or growth were statistically irrelevant on their own. Policy activation requires a comprehensive macroeconomic transition.



6.2 Africa and the Reform Activation Zone

The near-zero baseline probability observed in Ghana is not an isolated regional anomaly. As established in Section 5.7, the structural realities of Sub-Saharan African economies routinely place them below the standard activation zone. Table 6.2 places Ghana within its peer context, mapping out the primary binding constraints.

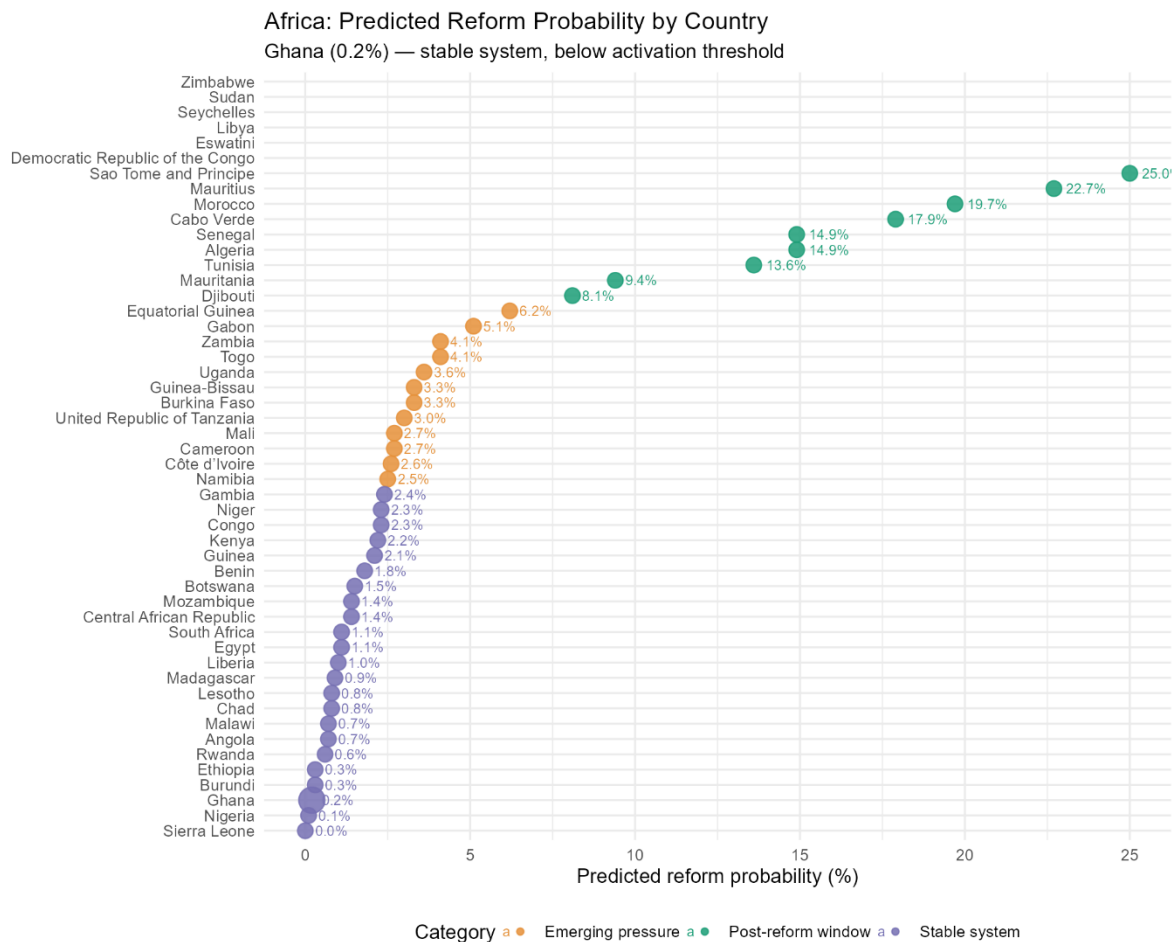
Table 6.2: Predicted Reform Probability — Selected African Countries

Country	Predicted Probability	Key Constraint
Ghana	0.20%	High inflation, closed reform window
Nigeria	0.10%	Very high inflation (33%)
Ethiopia	0.30%	Low income, high inflation
South Africa	1.10%	Mature system, low pressure

The takeaway from these near-zero baselines is not that these countries face permanent policy stagnation. On the contrary, African nations maintain an unconditional reform velocity that slightly outpaces the global average (2.88% versus 2.29%). Rather, it indicates that the standard toolkit of economic and demographic predictors fails to capture the true drivers of policy activation in the global South. Many African countries reside permanently below the active threshold range where marginal,

incremental shifts in fundamentals alter legislative probability. Reform activation in these environments is not a linear function of marginal adjustments. Instead, it requires discrete, non-linear shocks, such as sustained disinflation, shifts in domestic political configurations, or external institutional catalysts like IMF programme conditionality. Standard economic variables lose their predictive grip where the baseline structural prerequisites for self-sustaining formal schemes are absent.

Figure 6.2: Africa — Predicted Reform Probability by Country



6.3 Reform Persistence and the Case for Sequencing

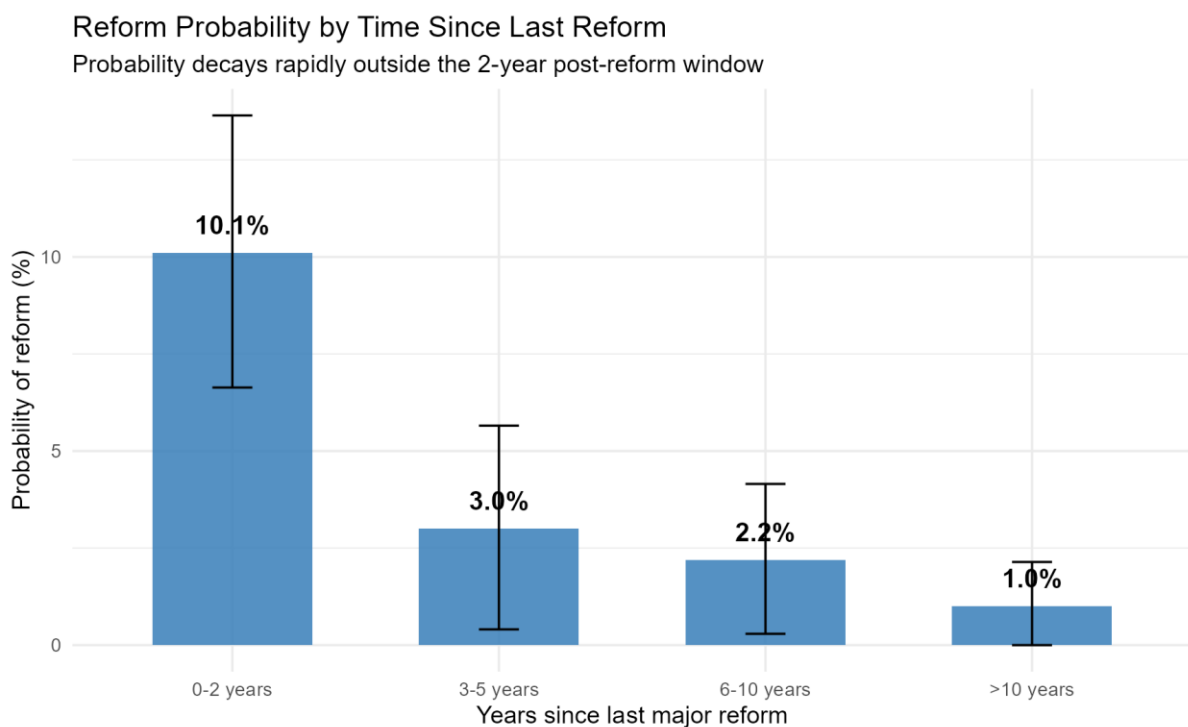
Section 5.3 established that the single most powerful predictor of a current pension intervention is proximity to a prior pension intervention, with the conditional probability jumping from 2.45% to 10.10% within a compact two-year post-reform window. This path-dependent clustering represents the most actionable empirical finding for policy framework.

The policy implication for transition design is direct. If a government successfully opens a policy window to pass an initial structural bill, it must aggressively leverage

that open window to sequence complementary, politically difficult parametric measures before institutional stickiness hardens. Conversely, if a country's historical reform window has long since closed, the optimal strategy transitions from active legislative pushing to rigorous ex-ante package preparation. Policymakers must draft and actuarially vet comprehensive packages in advance, ensuring that when an unpredictable window opens, whether through rapid macroeconomic stabilization, political shifts, or external pressure, the unified package is ready for execution.

For Ghana, the historic 2008 reform window is long closed. The next window will most likely open through sustained macroeconomic stabilization. The simulations suggest that maintaining durable single-digit inflation significantly raises the reform probability to 4.30%. If this disinflation coincides with a political opening, the activation probability rises dramatically. Macroeconomic stabilization is therefore not merely an end in itself. It is the structural anchor required to reopen closed institutional pathways.

Figure 6.3: Reform Probability by Time Since Last Reform

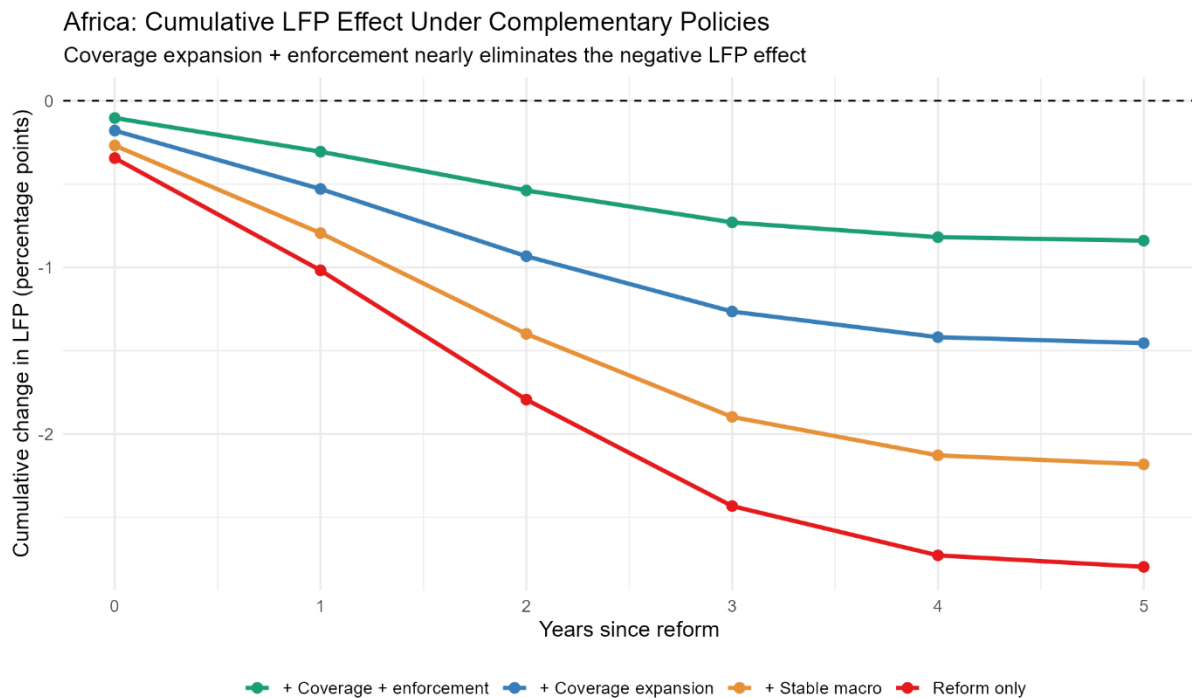


6.4 Implications for Reform Design

The global estimates carry a second critical implication: the ultimate effectiveness of any statutory pension change depends on the institutional and labour market context in which it is implemented. In economies characterized by low statutory coverage and extensive labour market informality, standard parametric adjustments operate through

narrow formal employment channels that reach only a fraction of the aggregate workforce. Reform design cannot be divorced from broader structural labour reforms. Statutory changes to contribution rates or retirement ages will fail to produce meaningful aggregate effects unless accompanied by active measures to expand formal coverage and strengthen enforcement capacity.

Figure 6.4: Cumulative Labour Market Effects Under Complementary Policies



6.5 Ghana's Reform Readiness Dashboard

Table 6.3 translates the empirical thresholds into a monitoring framework for Ghana.

Table 6.3: Ghana — Reform Readiness Dashboard

Structural Indicator	Current Ghanaian Value	Empirical Threshold	Operational Status
Temporal distance since last major reform	18 years (2008–2026)	Less than 2 years	⊙ Not Met

Consumer Price Index (Inflation)	~3.4% (Active Disinflation)	Less than 10% (Single-Digit)	⊗ Met
Real GDP Growth Rate	~3.1% Baseline	Greater than 0% (Positive Growth)	⊗ Met
Old-Age Dependency Ratio	~6.0% Baseline	Rising Trend Line	⊙ Monitoring
Aggregate Formal Pension Coverage	~15% of Total Workforce	Greater than 20% Penetration	⊙ Not Met
Regulatory Enforcement Capacity	Developing Framework	Statutory Strengthening	⊙ Monitoring

Status Summary: Ghana meets two of six empirical thresholds. Inflation and GDP growth are within target ranges, reflecting successful macroeconomic stabilization. The binding constraints are the closed post-reform window (18 years since the 2008 landmark reform) and low formal pension coverage (approximately 15% of the workforce, against a 20% threshold). The old-age dependency ratio and enforcement capacity require ongoing monitoring as demographic and institutional conditions evolve.

6.6 Policy Decision Framework

The empirical findings can be distilled into a four-phase decision framework for pension reform strategy.

Phase I: Macroeconomic Feasibility Audit. Prioritize price stability. If inflation exceeds the single-digit threshold, all legislative capital must be directed toward monetary stabilization. Parametric pension adjustments attempted during periods of high price volatility are structurally fragile and politically unviable.

Phase II: Temporal Path Auditing. If inflation drops below the single-digit threshold, audit the temporal distance since the last major reform. If the country resides within the active two-year post-reform window, deploy aggressive parametric bundling to pass secondary adjustments before institutional pathways calcify.

Phase III: Passive Package Preparation. If the country has been static for more than a decade, recognize that the historical window is closed. Transition to an ex-ante preparation model, building comprehensive actuarial consensus so that the unified policy package is ready when an external shock or political transition reopens the activation threshold.

Phase IV: Structural Leakage Mitigation. Integrate all statutory parametric changes with concurrent labour market formalization strategies. In high-informality settings, enforcement strengthening and specialized contribution mechanisms for informal

workers must be built into the core transition design to prevent reforms from being trapped within a narrow formal-sector silo.

This framework is not a substitute for country-specific institutional analysis. It provides an empirically validated starting point grounded in systematic cross-country evidence, an approach that has been absent from the social protection literature.

7. CONCLUSION

This paper has examined the determinants of pension reform occurrence using a newly constructed dataset of 790 policy events across 183 countries over the period 2000 to 2024. While the existing literature has focused primarily on the effects of reform, this paper shifts attention to the prior question of reform occurrence, when and why reforms happen. Three findings emerge.

First, pension reform is best understood as a threshold phenomenon rather than a linear response to economic or demographic pressures. Macroeconomic stability and labour market depth define the conditions under which reform becomes feasible, but the variables most commonly invoked in policy discourse, demographic pressure and government debt, are not significant predictors of major reform in the data. This does not imply that population ageing is irrelevant to pension policy. Rather, it suggests that demographic pressure operates over longer horizons, creating the background conditions against which more immediate macroeconomic and institutional triggers determine reform timing. Second, reform is strongly state dependent. The probability of reform is approximately 10% within two years of a previous major reform and declines to roughly 1% after a decade. This clustering, the single strongest empirical result in the paper, indicates that pension reform follows a process of institutional sequencing rather than consisting of isolated policy events. Third, the determinants of reform depend on how reform is measured. Major structural and parametric reforms have systematically different predictors from minor administrative amendments. Treating all reform events as equivalent conflates the political economy of consequential reform with the correlates of routine bureaucratic maintenance.

The policy simulations translate these findings into a practical framework for regulators. Applied to Ghana, a country that implemented a landmark reform in 2008 but has not undertaken a major parametric adjustment since, the results indicate that the country historically lay below the reform activation threshold, with inflation emerging as the binding constraint. Ghana's recent disinflation has cleared this monetary barrier, but stabilization alone is insufficient. For reform to have meaningful impact, it must be accompanied by parallel measures to expand formal coverage and strengthen enforcement.

For African pension systems more broadly, three implications follow. First, reform timing is strategic. If a government opens a policy window through an initial structural bill, it should exploit that window to sequence complementary parametric measures before institutional momentum dissipates. Second, macroeconomic stabilization is a prerequisite for reform feasibility. Complex parametric overhauls attempted during periods of severe price volatility are politically unviable. Third, in high-informality settings, parametric reform alone is insufficient without parallel efforts to expand coverage and strengthen institutional capacity. Statutory adjustments will be trapped within narrow formal-sector silos unless accompanied by informal-sector tracking, improved data systems, and stronger regulatory enforcement.

The analysis has limitations. The annual panel framework does not rule out the possibility that demographic pressure operates over longer horizons than the annual lag structure can capture. The estimates establish systematic partial correlations rather than causal effects. Future research incorporating sub-national political variables, electoral cycles, interest group mobilization, and legislative veto points, would further enrich these findings. This study provides the first systematic cross-country evidence on the determinants of pension reform and demonstrates that these determinants differ across reform types. The findings suggest that pension reform is not a marginal policy adjustment but a discrete event that occurs only when macroeconomic conditions, institutional momentum, and policy readiness align.

Appendices: Robustness Checks

Table A1: Rare-Events Logit — Major Reform

Variable	Estimate	Std. Error	p-value
Old age dependency ratio (t-1)	-0.0514	0.0348	0.14
Life expectancy (t-1)	0.1474	0.1059	0.164
Log GDP per capita (t-1)	-0.015	0.4807	0.975
GDP growth (t-1)	-0.0699	0.0601	0.245
Inflation (CPI, t-1)	-0.1074	0.0733	0.143
Government debt (% GDP, t-1)	0.0054	0.0087	0.532
Labor force participation (t-1)	-0.0436	0.0247	0.077*
Unemployment rate (t-1)	-0.0695	0.0518	0.18
Years since last major reform	-0.0003	0.0001	0.001***

Notes: Logit model with region and year fixed effects. Standard errors in parentheses. Estimation sample includes all 183 countries with available covariates.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A2: Logit — Any Reform Activity

Variable	Estimate	Std. Error	p-value
Old age dependency ratio (t-1)	0.0637	0.0138	0.000***
Life expectancy (t-1)	0.0582	0.0318	0.068*
Log GDP per capita (t-1)	-0.1955	0.1451	0.178
GDP growth (t-1)	-0.0145	0.0237	0.543
Inflation (CPI, t-1)	-0.0144	0.0154	0.348
Government debt (% GDP, t-1)	-0.0104	0.0047	0.027**
Labor force participation (t-1)	-0.0087	0.0096	0.366
Unemployment rate (t-1)	0.0158	0.014	0.261
Years since last major reform	-0.0001	0.0001	0.019**

Notes: Logit model with region and year fixed effects. Dependent variable includes all recorded reform activity (minor amendments, implementation years, and major reforms). Estimation sample includes all 183 countries. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A3: Linear Probability Model — 3-Year Reform Window

Variable	Estimate	Std. Error	p-value
Old age dependency ratio (t-1)	0.0067	0.0039	0.087*
Life expectancy (t-1)	0.0019	0.0035	0.592
Log GDP per capita (t-1)	-0.0356	0.048	0.459
GDP growth (t-1)	0.0009	0.0016	0.579
Inflation (CPI, t-1)	-0.0002	0.0002	0.332
Government debt (% GDP, t-1)	-0.0003	0.0002	0.179
Labor force participation (t-1)	-0.0008	0.0023	0.729
Unemployment rate (t-1)	-0.0002	0.0026	0.93

Notes: Linear probability model with country and year fixed effects. Dependent variable is an indicator equal to one if a major reform occurred in year t, t-1, or t-2. Standard errors clustered at the country level. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table A4: Reform Intensity (0–3 Scale)

Variable	Estimate	Std. Error	p-value
Old age dependency ratio (t-1)	0.0092	0.0052	0.081*
Life expectancy (t-1)	0.0026	0.0045	0.565
Log GDP per capita (t-1)	-0.0493	0.0588	0.403
GDP growth (t-1)	-0.0016	0.0017	0.337
Inflation (CPI, t-1)	-0.0006	0.0003	0.030**
Government debt (% GDP, t-1)	-0.0005	0.0002	0.013**
Labor force participation (t-1)	-0.0009	0.0034	0.787
Unemployment rate (t-1)	0.0003	0.0035	0.926

Notes: Linear probability model with country and year fixed effects. Dependent variable is reform intensity coded as 3 = major structural, 2 = major parametric, 1 = minor amendment, 0 = no reform. Standard errors clustered at the country level. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table A5a: Regional Heterogeneity — Africa

Variable	Estimate	Std. Error	p-value
Old age dependency ratio (t-1)	0.0373	0.025	0.144
Life expectancy (t-1)	0.001	0.0019	0.593
Log GDP per capita (t-1)	0.0042	0.0448	0.926
GDP growth (t-1)	-0.0012	0.0009	0.21
Inflation (CPI, t-1)	-0.0002	0.0001	0.011**
Government debt (% GDP, t-1)	-0.0003	0.0001	0.005***
Labor force participation (t-1)	-0.0029	0.0025	0.256
Unemployment rate (t-1)	-0.0061	0.003	0.049**

Notes: Linear probability model with country and year fixed effects, estimated on African countries only (50 countries). Dependent variable is an indicator for major structural or parametric reform. Standard errors clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Table A5b: Regional Heterogeneity — Non-Africa

Variable	Estimate	Std. Error	p-value
Old age dependency ratio (t-1)	0.0005	0.0016	0.735
Life expectancy (t-1)	0.0019	0.0025	0.459
Log GDP per capita (t-1)	-0.0589	0.0233	0.013**
GDP growth (t-1)	0.0007	0.0008	0.367
Inflation (CPI, t-1)	0	0.0002	0.833
Government debt (% GDP, t-1)	-0.0002	0.0002	0.258
Labor force participation (t-1)	0.0024	0.0011	0.027**
Unemployment rate (t-1)	0.0004	0.0011	0.739

Linear probability model with country and year fixed effects, estimated on non-African countries only (133 countries). Dependent variable is an indicator for major structural or parametric reform. Standard errors clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

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