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Necessity-Driven Entrepreneurship, Job Creation, and Structural Unemployment: Cross-Country Panel Evidence with Qualitative Insights

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Abstract

This study examines the association between necessity-driven entrepreneurship (NDE), job creation, and structural unemployment using a convergent mixed-methods design. The quantitative strand uses cross-country panel data from 45 countries over 2013–2023, drawing on GEM, World Bank, ILO, and governance datasets. Two-way fixed-effects models with Driscoll–Kraay standard errors are complemented by system GMM robustness checks and bootstrap-based mediation tests. The qualitative strand draws on 12 semi-structured interviews with necessity entrepreneurs, policy officials, entrepreneurship program administrators, and labor market experts to contextualize the quantitative patterns. The findings indicate that higher NDE is associated with lower structural unemployment and higher formal employer entry, with evidence consistent with a partial formal job-creation pathway linking NDE and structural unemployment. The results further suggest that institutional support and human capital condition the strength of these associations. Interview evidence illustrates plausible mechanisms, including regulatory friction, financing constraints, formalization barriers, and managerial capability gaps. Because the study relies on observational cross-country data and formal-sector proxies, the findings should be interpreted as evidence of conditional associations rather than definitive causal effects. The study contributes by clarifying the circumstances under which NDE may function as a productive labor market adjustment mechanism.

KEYWORDS

necessity-driven entrepreneurship; structural unemployment; job creation; institutional support; human capital; panel data; mixed methods.

Introduction

Structural unemployment represents one of the most intractable challenges in contemporary labor economics. Unlike cyclical unemployment, which recedes as aggregate demand recovers, structural unemployment is embedded in the misalignment between the skills and locations of available workers and the requirements of available jobs. Technological displacement, automation, sectoral restructuring, and institutional rigidities have intensified structural mismatches across both advanced and emerging economies over the past two decades (Dong et al., 2026). The persistence of structural unemployment even in periods of robust GDP growth has exposed the limitations of macroeconomic stabilization policy as the primary remedial instrument, redirecting scholarly and policy attention toward supply-side mechanisms of labor market adjustment (Denderski & Sniekiers, 2024a; Hou et al., 2024).

Entrepreneurship has long occupied a prominent position in theories of economic dynamism and employment generation (Camarero Garcia & Murmann, 2025; Simarasi et al., 2026). The creation of new ventures introduces productive capacity, consistent with employment opportunities, and reallocates resources from declining sectors toward emerging activities (Hägg et al., 2025). Necessity-driven entrepreneurship (NDE), however, arises when individuals enter self-employment in the absence of acceptable wage-employment alternatives, raising fundamental questions about its productivity,

survival prospects, and capacity may support employment for others (Deng, Liang, Wang, et al., 2025; Vidal et al., 2025). If NDE is primarily a survivalist response to joblessness, characterized by low capital intensity, limited innovation, and fragile business models, its contribution to structural unemployment reduction may be negligible or even counterproductive. An alternative perspective recognizes that necessity-driven ventures may be positioned to absorb structurally displaced workers, develop sector-bridging competencies, and consistent with micro-level employment in underserved niches (Grashuis, 2021; Mindes & Lewin, 2021; Sendra-Pons et al., 2022).

Despite growing empirical attention to both phenomena, the nexus between NDE and structural unemployment remains systematically underexplored. Prior studies have examined the relationship between aggregate entrepreneurship rates and total unemployment (Bergholz et al., 2025; Deng, Liang, Zhang, et al., 2025) or analyzed NDE in cyclical downturns, but the specific question of whether NDE is associated with lower structural unemployment, whether formal job creation helps explain this association, and under what institutional and human-capital conditions this pattern is more likely to emerge, and under what institutional and human capital conditions it does so, has not been addressed with the combined quantitative depth and qualitative contextual richness the question demands.

The GEM framework defines necessity-driven entrepreneurs as individuals who start businesses primarily because they perceive no better options for work (Poschke, 2025). The pessimistic view holds that necessity-driven ventures are inherently inferior forms: initiated under resource constraints, by individuals with limited business experience, in sectors with high competitive intensity. The optimistic view emphasizes transformational potential under appropriate enabling conditions: entrepreneurial experimentation is associated with learning and capability development that may support subsequent venture growth (Batz Liñeiro et al., 2024), and micro-level hiring effects emerge as surviving ventures recruit employees. These mechanisms collectively suggest that necessity entrepreneurship is associated with labor market benefits beyond immediate self-employment, provided enabling conditions permit venture survival and growth.

Push factors including job loss, wage inadequacy, and exclusion from formal labor markets drive individuals into entrepreneurship as an exit from an intolerable labor market position (Nor, 2024). The theory predicts NDE will be most prevalent in contexts with high structural unemployment, creating an endogenous co-movement between labor market conditions and entrepreneurship rates requiring careful econometric treatment, push theory does not preclude productive outcomes: the quality of push-induced entrepreneurship depends on enabling conditions, not solely on motivational origin (Giacomin et al., 2023; Weber et al., 2023).

Occupational choice theory models the wage employment-versus-self-employment decision as a rational allocation under resource constraints (Dvouletý, 2024). Individuals with lower expected returns from wage employment will rationally allocate their endowments to self-employment. In structural unemployment contexts, NDE represents the optimal response to a constrained opportunity set, and the theory predicts that self-employment productivity will be increasing in human capital and decreasing in institutional barriers to venture growth (Huang et al., 2023; Ragmoun, 2023).

(Sá et al., 2024) and (Doering & Wry, 2022) model unemployment as the product of matching frictions in decentralized labor markets. NDE can be reinterpreted as an endogenous response to persistent matching failure: rather than continuing to search for a match in the formal wage-

employment market, displaced workers create new productive units that is consistent with additional matches for other structurally displaced workers (Dencker et al., 2021; Nikiforou et al., 2019; Pritadrajati et al., 2021). This reframing positions NDE as a labor market adjustment mechanism and consistent with the prediction that NDE is expected to be associated with lower structural unemployment primarily to the extent that it may support job creation, the mechanism formalized in the mediation hypothesis.

Although recent studies have examined entrepreneurship-unemployment linkages, much of this literature continues to rely on aggregate entrepreneurship measures or total unemployment outcomes. Such approaches make it difficult to distinguish whether necessity-driven entrepreneurship represents a survival response to labor market exclusion or a productive adjustment mechanism in contexts of structural mismatch. Studies on necessity entrepreneurship have also tended to emphasize individual motivation, informality, or venture survival, while fewer studies explicitly test whether formal job creation mediates the relationship between NDE and structural unemployment. Institutional and human-capital conditions are often treated as background controls rather than as boundary conditions that shape whether necessity ventures can move beyond self-employment into employer-firm formation, this study therefore advances the literature by isolating NDE, focusing specifically on structural rather than total unemployment, testing formal job creation as a mediating pathway, and using qualitative interviews to interpret the institutional and capability mechanisms underlying the panel estimates.

This study addresses these gaps through a convergent mixed-methods design integrating cross-country panel econometrics with semi-structured interviews. Three primary objectives guide the inquiry: (1) to estimate the direct association between NDE and structural unemployment; (2) to test whether job creation mediates this relationship; and (3) to examine whether institutional support quality and human capital endowments condition the NDE-structural unemployment association. The study contributes to the intersecting literatures of the entrepreneurship-unemployment nexus, labor market adjustment theory, and the institutional economics of entrepreneurship.

The study makes three contributions. First, theoretically, it reframes NDE as a conditional labor-market adjustment mechanism rather than treating it uniformly as either survivalist or productive. Second, methodologically, it combines cross-country panel estimation with qualitative mechanism evidence, allowing the study to separate statistical associations from contextual interpretation. Third, from a policy perspective, it identifies formalization support, access to finance, and managerial capability development as conditions under which NDE is more likely to be associated with lower structural unemployment.

Literature Review

Structural Unemployment: Conceptual Boundaries

Structural unemployment is distinguished from other forms of unemployment by its origin in the fundamental reorganization of economic activity rather than in temporary demand shortfalls or frictional job-search processes. The canonical characterization traces structural unemployment to mismatches between job seekers and available vacancies across dimensions of skill, geography, industry, and institution (Estrin et al., 2024). Skill mismatch arises when displaced workers lack competencies demanded by expanding sectors (Suwakitti et al., 2024). Institutional rigidities, including stringent employment protection legislation and barriers to business formation, slow labor reallocation from declining to expanding sectors (Deng, Liang, et al., 2024).

Sectoral employment shifts associated with

deindustrialization and the rise of knowledge-intensive services have amplified all these mechanisms in recent decades. Long-term unemployment rate serves as the most widely available structural unemployment proxy, as extended unemployment spells are closely associated with skill depreciation, worker discouragement, and labor market detachment, all of which reflect structural rather than transitional unemployment dynamics (Deng, Orbes, et al., 2024).

NDE, Job Creation, and Structural Unemployment: Proposed Mechanisms

Four distinguishable mechanisms connect NDE to structural unemployment. Self-absorption removes an unemployed individual from the measured unemployed population upon venture creation (Grashuis, 2021; Wosiek, 2023). The micro-hiring effect captures employment generation as necessity ventures survive and expand beyond sole proprietorship. The sectoral reallocation effect reflects NDE's contribution to redistributing labor from declining to emerging sectors. The local market stimulation effect recognizes that new business activity is associated with demand-side spillovers supporting employment in adjacent sectors (Núñez & Morales-Alonso, 2024). These mechanisms collectively constitute the theoretical foundation for the direct and mediated NDE-to-structural-unemployment pathways.

Although several mechanisms may connect necessity-driven entrepreneurship to structural unemployment, formal job creation is prioritized as the central mediator in this study for both theoretical and empirical reasons. Theoretically, job creation is most directly aligned with search-and-matching theory because it reflects the formation of new employment relationships through which displaced or structurally mismatched workers may be absorbed into productive activity. Empirically, formal job creation can be measured more consistently across countries through employer business entry, which captures the transition from necessity-based self-employment into registered employer-firm activity. This mediator is therefore not intended to exhaust all possible NDE-related labor-market mechanisms. Self-absorption, informal hiring, local market stimulation, and sectoral reallocation may also contribute to the NDE–structural unemployment association, but these mechanisms are less consistently observable in cross-country panel data. Accordingly, the mediation analysis should be interpreted as evidence consistent with a formal job-creation pathway rather than as a complete account of all employment outcomes associated with NDE.

Moderating Conditions: Institutional Support and Human Capital

Institutional support encompasses the regulatory, financial, and informational infrastructure enabling new ventures to form, survive, and grow. Where institutional quality is high, the conversion of necessity ventures from survival activities to employer firms is facilitated by lower entry costs, reliable contract enforcement, and stronger enterprise development support (Bilan & Apostoae, 2023; Wosiek, 2023). Human capital determines the entrepreneurial capability of necessity entrepreneurs: individuals with greater education, vocational training, and cognitive skills are better positioned to identify viable market niches, manage operational complexity, and adapt to competitive pressures (Becker, 1964). Both boundary conditions motivate the moderation hypotheses that follow (Lukes & Feldmann, 2024).

Conceptual Model and Hypotheses

The theoretical analysis motivates a moderated mediation model in which formal job creation is examined as a pathway

linking necessity-driven entrepreneurship to lower structural unemployment. The model specifies three main associations: first, the NDE–job creation pathway; second, the job creation–structural unemployment pathway; and third, the residual NDE–structural unemployment association after accounting for job creation. Institutional support is theorized to strengthen the NDE–job creation association by reducing regulatory friction, formalization barriers, and financing constraints. Human capital is theorized to operate through two related pathways: it may strengthen the NDE–job creation association by improving entrepreneurial capability, managerial competence, and venture survival; it may also condition the NDE–structural unemployment association after accounting for job creation because higher human capital may improve the broader labor-market adjustment capacity of necessity entrepreneurship (Denderski & Sniekers, 2024b).

Hypothesis Development

H1: Necessity-Driven Entrepreneurship and Job Creation

Push theory and occupational choice theory suggest that necessity-driven entrepreneurship may be related to formal employer entry when some necessity-based ventures move beyond subsistence self-employment and begin to operate as registered employer firms. This relationship should not be understood as automatic or uniform, because many necessity ventures remain small, informal, and weakly growth-oriented. At the aggregate cross-country level, higher observed rates of NDE are therefore expected to be positively associated with formal employer business entry, used in this study as a proxy for formal job creation, particularly where necessity ventures are able to survive, formalize, and expand beyond sole proprietorship.

Hypothesis 1 (H1): Necessity-driven entrepreneurship is positively associated with job creation

H2: Necessity-Driven Entrepreneurship and Structural Unemployment

The association between NDE and structural unemployment may reflect several partially observable labor-market adjustment processes that extend beyond the formal job-creation channel. Self-absorption may occur when individuals who are unable to secure wage employment move into self-employment. Local market stimulation may arise when necessity-based ventures create demand linkages with nearby suppliers, customers, or service providers. Sectoral reallocation may also be reflected when displaced workers redirect their skills toward new or underserved market niches. These mechanisms do not imply that NDE automatically associated with structural unemployment, they suggest that NDE may be negatively associated with structural unemployment under conditions in which necessity-based activity can survive, adapt, and connect with broader labor-market adjustment processes. Hypothesis 2 (H2): Necessity-driven entrepreneurship is negatively associated with structural unemployment.

H3: The Mediating Role of Job Creation

Search-and-matching theory suggests that formal employer business entry may represent one observable pathway through which NDE is associated with structural unemployment, this pathway should be interpreted cautiously because employer business entry captures formal employer-firm formation rather than the full range of employment outcomes generated by necessity ventures. A partial mediation pattern is expected because other mechanisms, including self-absorption, informal hiring, local market stimulation, and sectoral reallocation, may also contribute to the NDE–structural unemployment association outside the formal hiring channel.

Hypothesis 3 (H3): Job creation is expected to partially mediate the association between necessity-driven entrepreneurship and structural unemployment, such that higher NDE is associated with higher formal employer entry, which in turn is associated with lower structural unemployment

H4: The Moderating Role of Institutional Support

In high-quality institutional environments, necessity-driven entrepreneurs are more likely to move from informal self-employment or sole proprietorship into formal employer-firm status. Supportive institutions is expected to be associated with lower regulatory burdens, facilitate business registration, improve access to finance, and provide advisory infrastructure that enables necessity ventures to survive and expand. These conditions strengthen the ability of NDE may be more likely to formal job creation, in environments characterized by high regulatory burdens, weak financial access, or inadequate support infrastructure, necessity entrepreneurs are more likely to remain confined to informal micro-scale survival activities, thereby weakening the NDE-to-job-creation pathway.

Hypothesis 4 (H4): Institutional support quality positively moderates the relationship between necessity-driven entrepreneurship and job creation, such that the positive association between NDE and job creation is stronger in countries with higher institutional quality.

H5: The Moderating Role of Human Capital

In economies with higher human capital endowments, necessity entrepreneurs are better positioned to identify viable market niches, manage operational complexity, adopt productive practices, and attract employees. These capabilities may strengthen the association between necessity-driven entrepreneurship and formal job creation because better skills and managerial capacity increase the likelihood that necessity ventures survive, formalize, and expand into employer firms. Human capital may also condition the association between NDE and structural unemployment after accounting for job creation, because higher workforce capability can improve the broader labor-market adjustment process through more effective sectoral reallocation, stronger employability, and more productive entrepreneurial adaptation.

H5a: Human capital positively moderates the association between necessity-driven entrepreneurship and job creation, such that the NDE–job creation association is stronger in countries with higher human capital.

H5b: Human capital moderates the association between necessity-driven entrepreneurship and structural unemployment after accounting for job creation, such that the negative NDE–structural unemployment association is stronger in countries with higher human capital.

Methods

Research Design

This study adopts a convergent mixed-methods design

Table 1. Variable Operationalization and Data Sources

Variable	Operationalization	Source	Expected Sign
Structural Unemployment (SU)	Long-term unemployment rate (% labor force ≥ 12 months)	ILO Statistics	Dependent
Necessity-Driven Entrepreneurship (NDE)	Necessity-driven early-stage TEA (% adult population)	GEM APS	–
Job Creation (JC)	Employer business entry rate (new firms / 1,000 adults)	World Bank	Mediator
Institutional Support (INS)	Regulatory Quality Index (WGI)	World Bank WGI	Moderator (+)
Human Capital (HC)	Human Capital Index	World Bank HCI	Moderator (+)
GDP Growth	Annual GDP growth rate (%)	World Bank WDI	–
GDP per Capita (log)	Log of GDP per capita (constant 2015 USD)	World Bank WDI	–
Inflation	CPI-based annual inflation rate (%)	World Bank WDI	+
FDI	FDI net inflows (% of GDP)	World Bank WDI	–
Urbanization	Urban population (% of total)	World Bank WDI	Control
Digital Penetration	Internet users (% of population)	World Bank WDI	Control
Labor Market Rigidity	Rigidity of Employment Index	World Bank	+
Crisis Dummy	Binary indicator = 1 for 2020-2021	Manual coding	+

Source: Authors' calculations

(Creswell & Plano Clark, 2018) in which quantitative panel econometrics and qualitative semi-structured interview data are collected and analyzed independently, then merged at the interpretation stage to provide complementary analytical depth. The quantitative strand provides macro-level estimation of the hypothesized direct, mediated, and moderated relationships using cross-country panel data, capturing aggregate behavioral regularities that transcend individual cases. The qualitative strand provides mechanism-level depth through first-person accounts from necessity entrepreneurs, labor market policy officials, entrepreneurship program administrators, and applied labor economists, illuminating the proximate processes, institutional barriers, and capability dynamics underlying the statistical patterns. The rationale for integrating qualitative evidence rests on three methodological grounds. First, moderated mediation models at the country level capture aggregate patterns without revealing within-country processes through which institutional quality and human capital may be more likely to entrepreneurial capability and hiring behavior; interview evidence fills this explanatory gap. Second, the theoretical distinction between NDE as survivalism versus productive adjustment is inherently a question about subjective motivation, adaptive behavior, and institutional experience that survey and administrative data cannot fully capture. Third, previous critiques of the entrepreneurship-unemployment nexus literature have noted the predominance of macro-statistical correlational designs without sufficient attention to the mechanisms and agency through which individual entrepreneurial decisions aggregate into observable labor market outcomes; the mixed-methods design directly responds to this critique.

Data Sources and Sample

The primary source for NDE data is the Global Entrepreneurship Monitor (GEM) Annual Population Survey. The sample comprises 45 countries observed over 2013–2023, yielding a maximum of 495 country-year observations. Country selection is determined by data availability across all primary variables for a minimum of six consecutive years. The sample intentionally spans high-income, upper-middle-income, and lower-middle-income countries across five major world regions (Monitor, 2024). Control variables are drawn from the World Bank WDI, ILO statistics, World Governance Indicators, and OECD Statistics.

Variable Operationalization

Table 1. provides a complete overview of variable operationalizations and sources.

Job creation is proxied by the employer business entry rate, defined as new employer firms per 1,000 adults. This measure is appropriate for the present study because the proposed mechanism concerns the transition from necessity-based self-employment into formal employer activity. The measure captures formal employer registration rather than total employment creation by necessity ventures, it may therefore underestimate employment effects in economies where necessity entrepreneurs hire informally or delay formal registration, the mediation results should be interpreted as evidence consistent with a formal job-creation channel rather than the full range of employment outcomes associated with NDE.

Model Specification

Five regression models are estimated in sequence to test the proposed hypotheses and to align the empirical specification with the moderated mediation framework. All continuous variables are standardized prior to estimation.

- 1) Model 1: Direct association between NDE and structural unemployment

$$SU_{it} = \alpha + \beta_1 NDE_{i(t-1)} + \beta_k Controls_{it} + \mu_i + \tau_t + \varepsilon_{it}$$
- 2) Model 2: Association between NDE and job creation

$$JC_{it} = \alpha + \beta_1 NDE_{i(t-1)} + \beta_k Controls_{it} + \mu_i + \tau_t + \varepsilon_{it}$$
- 3) Model 3: Mediation model

$$SU_{it} = \alpha + \beta_1 NDE_{i(t-1)} + \beta_2 JC_{i(t-1)} + \beta_k Controls_{it} + \mu_i + \tau_t + \varepsilon_{it}$$
- 4) Model 4a: Moderation of the NDE-to-job-creation pathway

$$JC_{it} = \alpha + \beta_1 NDE_{i(t-1)} + \beta_2 INS_{it} + \beta_3 [NDE_{i(t-1)} \times INS_{it}] + \beta_4 HC_{it} + \beta_5 [NDE_{i(t-1)} \times HC_{it}] + \beta_k Controls_{it} + \mu_i + \tau_t + \varepsilon_{it}$$
- 5) Model 4b: Conditional association with structural unemployment

$$SU_{it} = \alpha + \beta_1 NDE_{i(t-1)} + \beta_2 JC_{i(t-1)} + \beta_3 INS_{it} + \beta_4 HC_{it} + \beta_5 [NDE_{i(t-1)} \times INS_{it}] + \beta_6 [NDE_{i(t-1)} \times HC_{it}] + \beta_k Controls_{it} + \mu_i + \tau_t + \varepsilon_{it}$$

Where SU denotes structural unemployment, JC denotes job creation, NDE denotes necessity-driven entrepreneurship, INS denotes institutional support, and HC denotes human

capital. The term μ_i denotes country fixed effects, τ_t denotes year fixed effects, and ε_{it} is the idiosyncratic error term. Model 1 tests the direct association between NDE and structural unemployment. Model 2 tests whether NDE is associated with job creation. Model 3 assesses whether the results are consistent with a job-creation mediation pathway between NDE and structural unemployment. Model 4a directly tests whether institutional support and human capital moderate the NDE-to-job-creation pathway. The interaction between NDE and institutional support corresponds to H4, while the interaction between NDE and human capital corresponds to H5a. Model 4b examines whether institutional support and human capital also condition the NDE–structural unemployment association after accounting for job creation. In this model, the NDE $\times$ human capital interaction corresponds to H5b. This two-stage specification separates

moderation of the mediator path from moderation of the structural-unemployment equation and prevents the first-stage job-creation mechanism from being conflated with the final outcome model.

The moderation tests are estimated in two stages to align the empirical specification with the hypothesized moderated mediation logic. Model 4a tests whether institutional support and human capital condition the NDE-to-job-creation path, which corresponds to the first-stage moderated mediation argument. Model 4b then examines whether these boundary conditions are also associated with the NDE-to-structural-unemployment relationship after accounting for job creation. This two-step specification separates moderation of the mediator path from moderation of the outcome path and avoids conflating the hypothesized mechanism with the final structural-unemployment equation.

The primary estimation strategy employs two-way fixed-effects regression with Driscoll-Kraay standard errors (Driscoll & Kraay, 1998), which are robust to heteroskedasticity, autocorrelation, and cross-sectional dependence. System GMM (Blundell & Bond, 1998) is applied as a robustness check to address potential dynamic panel bias and reverse causality concerns. Mediation is assessed primarily through bootstrap-based indirect effects using temporally ordered panel models. The Baron–Kenny steps are reported only as a descriptive diagnostic to show whether the estimated coefficients follow

Table 2. Qualitative Informant Profile

Code	Role / Category	Country	Sector / Context	Duration
INF-01	Necessity entrepreneur (formerly manufacturing)	Indonesia	Food & beverage micro-enterprise	68 min
INF-02	Necessity entrepreneur (formerly finance sector)	Indonesia	IT support & digital services SME	61 min
INF-03	Senior labour policy official	Indonesia	Dept. of Employment and Labour	72 min
INF-04	Entrepreneurship program administrator	Malaysia	SME Corp. necessity entrepreneur program	65 min
INF-05	Necessity entrepreneur (formerly retail employee)	Indonesia	Consumer goods trading & distribution	58 min
INF-06	Applied labor economist	Indonesia	University / labor market research center	74 min
INF-07	Microfinance institution manager	Indonesia	SME microfinance & enterprise development	63 min
INF-08	Policy researcher	Malaysia	National entrepreneurship & labor policy	70 min
INF-09	Necessity entrepreneur (formerly construction)	Indonesia	Building maintenance services (6 FTE)	66 min
INF-10	Regional development officer	Indonesia	Regional enterprise support authority	59 min
INF-11	Necessity entrepreneur (formerly assembly worker)	Malaysia	Catering & food service (3 FTE)	62 min
INF-12	NGO director (enterprise support)	Indonesia	Informal economy formalization program	71 min

Note: FTE = full-time equivalent employees at time of interview. All informants provided written informed consent. Informant codes are used throughout to protect identifiable details.

Source: Authors' calculations

the expected mediation pattern. Inference regarding mediation relies on the bootstrapped indirect effect and confidence intervals rather than on the Baron–Kenny sequence alone. This approach is more appropriate for panel settings because it emphasizes the uncertainty around the indirect pathway and is less dependent on stepwise significance testing (Baron & Kenny, 1986).

Qualitative Strand: Interview Design and Informant Selection

Semi-structured interviews were conducted with 12 informants purposively selected to represent maximum variation across four categories: (1) necessity entrepreneurs who entered self-employment following involuntary job displacement; (2) labor market and employment policy officials; (3) entrepreneurship program administrators; and (4) applied labor economists. Six countries were selected to capture variation on the study's primary boundary conditions: high versus low institutional quality, and high versus low human capital endowment (Creswell & Plano Clark, 2018). Indonesia and Malaysia were included, ensuring both enabling and constraining contexts were represented.

Each interview followed a semi-structured protocol of 55–75 minutes, covering five thematic domains: (a) direct experience of or observation of NDE in response to structural unemployment; (b) pathways through which necessity ventures do or do not consistent with employment for others; (c) the role of institutional conditions in shaping venture outcomes; (d) the influence of educational attainment and vocational capability on venture growth; and (e) assessment of effective or ineffective policy interventions. Interviews were audio-recorded with informed consent, transcribed verbatim, and analyzed using thematic analysis following (Braun & Clarke, 2006) in (Gupta, 2024). Thematic saturation was reached at the eleventh interview; the twelfth confirmed saturation. Table 2 provides the full informant profile.

The qualitative sample was not designed to provide statistical representativeness. Instead, it was designed for theoretical and contextual variation. Countries and informants were selected to capture contrasting institutional and human-capital environments relevant to the proposed boundary conditions. Indonesia and Malaysia were included to represent middle-income contexts in which necessity entrepreneurship, informality, formalization barriers, and SME policy support are empirically salient. The interview evidence is therefore used to interpret and illustrate plausible mechanisms behind the panel estimates, not to independently suggest the quantitative results in a statistical sense.

Endogeneity and Identification Strategy

Several features of the empirical design are intended to reduce, although not eliminate, endogeneity concerns. First, NDE is lagged by one period to introduce temporal ordering between necessity entrepreneurship and subsequent

changes in job creation and structural unemployment. This lag structure helps interest simultaneity concerns, but it cannot fully rule out anticipatory behavior, longer feedback effects, or delayed labor-market responses. Second, country fixed effects account for time-invariant national characteristics, including institutional traditions, long-run entrepreneurial culture, geography, and persistent labor-market structures. Third, year fixed effects capture common global shocks affecting all countries. Fourth, time-varying controls, including GDP growth, GDP per capita, inflation, FDI, labor-market rigidity, urbanization, and digital penetration, are included to help interest omitted-variable bias from observable macroeconomic and structural factors. Fifth, system GMM is used as a robustness check to address potential dynamic panel bias and reverse causality through internal instruments. These strategies improve the credibility of the estimated associations, but they do not transform the observational panel design into a causal identification strategy.

Result and Discussion

Descriptive Statistics and Preliminary Analysis

The descriptive statistics reveal substantial cross-country heterogeneity in both NDE and structural unemployment. The mean NDE rate across the panel is 3.8% of the adult population (SD = 2.6 percentage points), ranging from 0.3% in high-income OECD countries to 12.4% in lower-middle-income economies. The mean long-term unemployment rate is 2.9% (SD = 2.3). A preliminary bivariate inspection reveals a conditional rather than uniform pattern: among countries in the top quartile of institutional support quality, the correlation between NDE and structural unemployment is negative and moderate ($r = -0.31$, $p < 0.01$), while among countries in the bottom quartile, it is positive and weak ($r = +0.14$, $p = 0.18$), consistent with NDE reflecting economic distress rather than productive adjustment in adverse institutional contexts.

The descriptive statistics in Table 3 indicate considerable cross-country variation across the main variables. Structural unemployment has a mean value of 2.91%, with a relatively wide dispersion ranging from 0.12% to 11.78%. This suggests that the sample includes countries with very low long-term unemployment as well as countries facing more persistent labor-market mismatch. The NDE rate also varies substantially, with a mean of 3.82% and a maximum of 12.43%, indicating that necessity-driven entrepreneurship is more prominent in some country-year observations than in others.

Job creation, measured as employer business entry per 1,000 adults, has a mean of 5.47 and ranges from 0.81 to 14.62. This wide range supports the expectation that the capacity of entrepreneurial activity may be more likely to formal employer-firm formation differs meaningfully across countries. Institutional support also shows notable variation, with values ranging from -1.62 to 2.11, reflecting substantial

Table 3. Descriptive Statistics (N = 45 Countries, T = 2013–2023)

Variable	Mean	SD	Min	Max	N Obs.
Structural Unemployment (%)	2.91	2.34	0.12	11.78	482
NDE Rate (%)	3.82	2.61	0.29	12.43	471
Job Creation (employer firms/1,000)	5.47	3.22	0.81	14.62	468
Institutional Support (WGI, std.)	0.48	0.89	-1.62	2.11	495
Human Capital Index	0.62	0.14	0.31	0.88	490
GDP Growth (%)	2.18	3.41	-14.62	11.24	495
GDP per Capita (log)	9.71	0.82	7.34	11.23	495
Inflation (%)	3.42	4.18	-0.62	34.71	495
FDI (% GDP)	4.21	5.34	-3.44	31.28	495
Labor Market Rigidity (index)	42.18	18.34	4.00	84.00	478

Source: Authors' calculations based on GEM, World Bank, ILO, WGI, and related datasets

differences in regulatory quality and institutional environments. Similarly, the Human Capital Index ranges from 0.31 to 0.88, indicating that the sample captures countries with different levels of education, health, and productive capability.

The control variables also show meaningful heterogeneity. GDP growth ranges from -14.62% to 11.24%, reflecting both crisis-period contractions and strong expansion episodes during the 2013–2023 period. Inflation varies widely, with a maximum of 34.71%, suggesting that some country-year observations experienced significant macroeconomic instability. FDI inflows also differ substantially across the sample, ranging from -3.44% to 31.28% of GDP. Labor market rigidity ranges from 4.00 to 84.00, indicating substantial institutional diversity in employment regulation. Overall, these descriptive patterns support the use of a cross-country panel design because the sample contains sufficient variation in entrepreneurship, unemployment, institutional quality, human capital, and macroeconomic conditions to examine the proposed relationships.

Baseline Regression Results

Table 4 presents the baseline regression results for Models 1 and 2. In Model 1, the coefficient on lagged NDE is negative and statistically significant ($\beta = -0.187$, $SE = 0.074$, $p < 0.05$), indicating that a one-standard-deviation increase in the NDE rate is associated with a reduction of approximately 0.19 standard deviations in the long-term unemployment rate in the following period, after full controls. This finding provides direct support for H2. In Model 2, the coefficient on lagged NDE is positive and statistically significant ($\beta = 0.214$, $SE = 0.081$, $p < 0.01$), providing support for H1 and providing evidence consistent with the antecedent-to-mediator path.

The coefficient on lagged NDE is negative and statistically significant ($\beta = -0.187$, $SE = 0.074$, $p < 0.05$) in Model 1. This indicates that a one-standard-deviation increase in the NDE rate is associated with a subsequent decline of approximately 0.19 standard deviations in structural unemployment, after controlling for macroeconomic conditions, labor-market rigidity, country fixed effects, and year fixed effects, this result supports H2.

The coefficient on lagged NDE is positive and statistically significant ($\beta = 0.214$, $SE = 0.081$, $p < 0.01$) in Model 2, this suggests that higher NDE is associated with higher formal employer business entry in the following period. This finding provides evidence consistent with H1 and supports further examination of the proposed formal job-creation pathway, while remaining limited to an association-based interpretation.

The control variables generally show expected signs. GDP growth and GDP per capita are associated with lower structural unemployment and higher job creation, while inflation and labor-market rigidity are associated with less favorable labor-market outcomes. The COVID dummy is positively associated with structural unemployment and negatively associated with job creation, reflecting the adverse labor-market effects of the 2020–2021 crisis period.

Mediation Analysis: The Role of Job Creation

Model 3 introduces lagged job creation as a mediator. The coefficient on lagged NDE remains negative and significant but diminishes in magnitude ($\beta = -0.124$, $p < 0.05$), while job creation enters with a negative and significant coefficient ($\beta = -0.243$, $p < 0.001$).

The bootstrap-based indirect effect is negative and statistically distinguishable from zero. The Sobel test is reported as a supplementary diagnostic only (Sobel, 1982), a statistically significant indirect effect ($z = -2.84$, $p < 0.01$), and bootstrap confidence intervals provide evidence consistent with this indirect association (indirect effect = -0.052, 95% CI:

[-0.089, -0.019]), supporting H3.

The results are consistent with a partial mediation structure in which formal job creation accounts for an important portion of the NDE–structural unemployment association without exhausting it; the persistent direct NDE effect reflects self-absorption, local market stimulation, and sectoral reallocation mechanisms operating independently of formal employer-firm hiring.

The persistence of a significant NDE coefficient after the inclusion of job creation indicates that the job-creation pathway explains only part of the NDE–structural unemployment association. This residual direct association may reflect mechanisms that are not fully captured by formal employer entry data. These include self-absorption into self-employment, informal hiring within necessity ventures, local market stimulation through new micro-enterprise activity, and sectoral reallocation from declining industries into emerging local niches. The partial mediation result should therefore be interpreted as evidence that formal job creation is an important, but not exclusive, pathway linking NDE to lower structural unemployment.

Moderation Analysis: Institutional Support and Human Capital

Model 4a tests whether institutional support and human capital condition the NDE-to-job-creation pathway. The interaction between NDE and institutional support is positive and statistically significant, supporting H4. The interaction between NDE and human capital is also positive and statistically significant ($\beta = 0.126$, $SE = 0.057$, $p < 0.05$), indicating that the association between NDE and formal employer entry is stronger in countries with higher human capital. This result supports H5a.

Model 4b examines whether these boundary conditions are also associated with variation in structural unemployment after accounting for job creation. The interaction between NDE and human capital is negative and statistically significant ($\beta = -0.138$, $SE = 0.064$, $p < 0.05$), suggesting that the negative association between NDE and structural unemployment is

Table 4. Baseline Fixed-Effects Regression Results (Models 1–2)

Variable	Model 1: SU (Dependent)	Model 2: JC (Dependent)	Hypotheses
NDE (t-1)	-0.187** (0.074)	0.214*** (0.081)	H1, H2
GDP Growth	-0.156*** (0.042)	0.143** (0.058)	Control
GDP per Capita (log)	-0.322*** (0.089)	0.218** (0.091)	Control
Inflation	0.118** (0.051)	-0.087* (0.044)	Control
FDI	-0.092* (0.049)	0.104** (0.047)	Control
Labor Market Rigidity	0.198*** (0.063)	-0.143** (0.059)	Control
COVID Dummy (2020–2021)	0.287*** (0.081)	-0.198*** (0.072)	Control
Country FE / Year FE	Yes / Yes	Yes / Yes	
N (Observations)	468	458	
Within R ²	0.624	0.587	

Note: Driscoll-Kraay standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All continuous variables standardized.

Source: Authors' calculations

stronger in higher-human-capital contexts. This result supports H5b. Taken together, the results indicate that human capital matters at two levels: it strengthens the conversion of necessity entrepreneurship into formal employer activity, and it is also associated with a stronger NDE–structural unemployment relationship after the formal job-creation pathway is included.

Model 4b examines whether these boundary conditions are also associated with variation in structural unemployment after accounting for job creation. The interaction terms in the structural-unemployment equation are negative, suggesting

that NDE is more strongly associated with lower structural unemployment in countries with stronger institutional support and higher human capital. These results are interpreted as conditional associations rather than definitive causal effects.

Marginal effects analysis indicates that the estimated NDE–structural unemployment association is stronger at the 75th percentile of institutional quality than at the 25th percentile at the 75th percentile of institutional quality as at the 25th percentile (marginal effect = -0.31 versus -0.15). The interaction term NDE x HC is similarly negative and significant ($\beta = -0.138$, $p < 0.05$), supporting H5. The association between NDE and lower structural unemployment is approximately 80% stronger at the 75th percentile of the Human Capital Index than at the 25th percentile.

Model 4a directly tests the moderation of the NDE-to-job-creation pathway. The interaction between NDE and institutional support is positive and statistically significant ($\beta = 0.149$, $SE = 0.052$, $p < 0.01$), indicating that the association between NDE and job creation is stronger in countries with higher institutional quality. This result supports H4. The interaction between NDE and human capital is also positive and statistically significant ($\beta = 0.126$, $SE = 0.057$, $p < 0.05$), suggesting that human capital strengthens the ability of necessity-driven entrepreneurship may support formal employer entry, this result supports H5.

Model 4b then examines whether these boundary conditions are also associated with variation in structural unemployment after accounting for job creation. The interaction between NDE and institutional support is negative and statistically significant ($\beta = -0.161$, $SE = 0.058$, $p < 0.01$), while the interaction between NDE and human capital is also negative and statistically significant ($\beta = -0.138$, $SE = 0.064$, $p < 0.05$). These findings suggest that the negative association between NDE and structural unemployment is stronger in countries with more supportive institutions and higher human capital endowments, these results should be interpreted as conditional associations rather than definitive

causal effects (see Table 5).

Marginal effects analysis further illustrates the conditional nature of the NDE–structural unemployment relationship. The estimated association is stronger at the 75th percentile of institutional quality than at the 25th percentile, suggesting that institutional support may improve the conversion of necessity entrepreneurship into productive labor-market adjustment. Similarly, the association is stronger in higher-human-capital contexts, indicating that entrepreneurial capability and workforce skill endowments may condition the labor-market relevance of NDE.

Qualitative Mechanism Evidence

The qualitative evidence is used to contextualize and interpret the statistical patterns rather than to provide statistically representative confirmation. The interviews illustrate how institutional barriers, financing constraints, formalization processes, and managerial capability gaps shape the observed quantitative relationships, and the qualitative evidence illustrates and extends these aggregate patterns. INF-06 drew attention to the compositional heterogeneity within the NDE construct that aggregate statistics mask:

“We tend to talk about necessity entrepreneurship as if it is one thing, but it is not. In the same national dataset, you have someone who started a business because a factory closed and they had no other option, and someone who started because the formal sector simply does not exist in their area. The macro number aggregates these, but the behavioral dynamics, and the labor market outcomes, are very different. The first group, the displaced industrial workers, are more likely to scale and hire if they get the right support. The second group are survival operators, and that is what they will remain without deep institutional change.” — INF-06, Applied Labor Economist, Indonesia

This account illustrates the self-absorption mechanism: the transition from long-term job search into necessity-based self-employment may be more likely to exposure to structural unemployment even before the venture creates formal jobs for others.

This observation carries important methodological implications. INF-06 effectively identifies a source of heterogeneity within the NDE construct that cross-country aggregate data cannot fully resolve: displaced-worker necessity entrepreneurship, which arises from sectoral restructuring and closely aligns with the structural unemployment problem this study addresses, exhibits different growth and hiring dynamics than chronic informal-sector necessity

Table 5. Mediation and Moderation Results (Models 3-4)

Variable	Model 3: SU Mediation	Model 4a: JC Moderation	Model 4b: SU Conditional Model	Hypothesis
NDE (t-1)	-0.124** (0.061)	0.176** (0.074)	-0.118** (0.054)	H1 / H2
Job Creation (t-1)	-0.243*** (0.072)	–	-0.231*** (0.069)	H3 ✓
Institutional Support (INS)	-0.188*** (0.071)	0.203*** (0.068)	-0.192*** (0.073)	Control
Human Capital (HC)	-0.241*** (0.082)	0.187** (0.079)	-0.237*** (0.079)	Control
NDE × Institutional Support	–	0.149*** (0.052)	-0.161*** (0.058)	H4 ✓
NDE × Human Capital	–	0.126** (0.057)	-0.138** (0.064)	H5a in Model 4a; H5b in Model 4b ✓
Bootstrapped indirect association	-0.052** [-0.089, -0.019]	–	–	H3 ✓
Country FE / Year FE	Yes / Yes	Yes / Yes	Yes / Yes	
N (Observations)	451	446	448	
Within R ²	0.671	0.642	0.693	

Note: Driscoll-Kraay standard errors in parentheses. Bootstrap CI in brackets (1,000 replications). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All continuous variables standardized. Control variable coefficients suppressed for brevity.

Source: Authors' calculations

entrepreneurship, which reflects persistent institutional exclusion. The positive NDE-to-structural-unemployment correlation observed among low-institutional-quality countries is consistent with this interpretation: in those contexts, the NDE population is predominantly composed of survival operators whose activity does not consistent with the adjustment mechanisms that is associated with lower structural unemployment, the moderation analysis provides quantitative patterns that align with this contextual differentiation.

The institutional heterogeneity of NDE outcomes was similarly prominent in the account of INF-03, who situated NDE patterns within the broader structural labor market context:

"Our long-term unemployment rate has been above four percent for most of the past decade. People do go into self-employment, and we see high activity in informal trade and services. But what we do not see consistently is those activities growing into formal businesses that create jobs for other unemployed people. The missing piece is almost always the same: access to financing at the right cost, a business registration process that does not intimidate someone without secondary education, and someone to call when there is a legal or operational problem. Without those things, the entrepreneur stays at survival level, and the structural unemployment problem stays unsolved." — INF-03, Senior Labour Policy Official, Indonesia

INF-03's account presents the NDE-structural unemployment nexus as a problem of institutional infrastructure rather than entrepreneurial motivation. The three institutional gaps identified, financing accessibility, formalization barriers, and advisory infrastructure, correspond precisely to the dimensions of the Regulatory Quality composite indicator used in the quantitative moderation models, providing mechanism-level context for interpreting the institutional support moderator and its underlying processes as experienced by practitioners on the ground.

The quantitative evidence that NDE is associated with lower structural unemployment is consistent with the micro-level push dynamics described by necessity entrepreneurs themselves. INF-01 described his transition from displaced factory worker to food entrepreneur in terms that align directly with both the push-pull mechanism and the self-absorption pathway:

"When the plant announced the closure, everyone started looking for work, but there was nothing in our area for someone like me, with my skills and my age. I had worked in production for eighteen years. The market for that was gone. I thought, if no one will hire me, I will hire myself. I started selling food from a cart in the central market. I did not think of it as being an entrepreneur. I thought of it as surviving. But after two years, I was doing well enough that I needed help, and I hired my nephew, and then a neighbor woman who had also lost her job." — INF-01, Necessity Entrepreneur (formerly manufacturing), Indonesia

INF-01's account captures the self-absorption mechanism at its most direct: the transition from unemployment to self-employment was a necessity-driven response to structural labor market failure produced by plant closure and sectoral contraction. The subsequent hiring of two additional displaced workers illustrates the micro-hiring effect that, when aggregated across sufficient volumes of necessity ventures, may support the employer business entry rate increases detected in Model 2. The two-year temporal delay between venture founding and first hire reported by INF-01 is also methodologically significant: it suggests the NDE-to-job-creation pathway operates with a lag consistent with the one-period specification employed in the econometric models. The account also illustrates why formal employer entry may

underestimate the employment relevance of NDE. Informal or delayed hiring may occur before the venture appears in formal employer-firm statistics.

INF-05 provided a complementary account from a lower-middle-income context, highlighting how the same push dynamics interact with the sectoral reallocation mechanism:

"I was working as a salesperson for a retail company that closed. I already knew many small shop owners because of my previous work, so I started buying goods in bulk and supplying them to these small shops. I did not really know how to run a business properly at first. I made many mistakes. But slowly it grew. Now I have two people who work with me full-time, and I work with maybe thirty small businesses as customers. Before I started, those thirty businesses were buying from bigger distributors in the city. Now there is a local distribution chain that did not exist before." — INF-05, Necessity Entrepreneur (formerly retail employee), Indonesia

INF-05's account provides an illustrative case of sectoral reallocation at the individual level. The transition from retail employment to micro-distribution entrepreneurship is consistent with movement from a declining employment position into an emerging market niche that was not readily available through formal wage employment. The emergence of a local supply chain serving small businesses may also be interpreted as a possible local market stimulation pathway, because the venture appears to have supported demand linkages among nearby businesses. This account should be treated as contextual mechanism evidence that helps interpret the partial mediation result, not as independent proof of the panel estimates.

The interview evidence provides micro-level illustration of the job creation pathway and the enabling conditions required for its development. INF-09, who had hired six full-time employees after starting a building maintenance venture following construction sector displacement, described the transition from self-employment to employer status in terms that directly illuminate the mediating mechanism:

"The first three years I worked alone. I did everything myself, which meant I could only take small jobs. The turning point was when a large property management company gave me a maintenance contract for four buildings. Suddenly I needed people. I called three people I knew who were also looking for work after the construction sector slowed down. Then word spread and others came to me. But I want to be clear: I could only give them formal employment, with contracts and insurance, because someone from the local business development office helped me register the company properly and access a government loan. Without that, I would have kept them as informal daily workers, and they would not show up in any statistics as employed." — INF-09, Necessity Entrepreneur (building maintenance services), Indonesia

INF-09's account offers a useful illustration of how formal employer entry may emerge gradually from necessity-based self-employment. The transition from working alone to hiring formal employees appears to have depended on both market demand and institutional support, including formal registration assistance and credit access. The distinction between informal daily work and formal employment is also relevant to the measurement strategy, because the employer business entry rate captures formal registration rather than all employment relationships associated with necessity ventures. This case therefore helps contextualize the formal job-creation proxy without implying that the interview evidence verifies the quantitative model.

INF-11, who had started a catering business following manufacturing redundancy and had hired three formal employees at the time of interview, described a similar trajectory that adds nuance regarding the role of public

demand as a job-creation trigger:

"I started cooking and selling food from my house after the factory shut down. Most of my first customers were also former factory workers. Then I got a catering contract from a school. To fulfill that contract, I had to hire two other women, both of whom had lost jobs. After the school contract, I got two more. Now I have three regular employees and five casual helpers for large events. What I would tell any policy person is this: the contract was the job creator, not me personally. The government procurement program that gives small catering businesses access to public institution contracts, that is what created jobs. I was the vehicle, not the engine."— INF-11, Necessity Entrepreneur (catering and food service), Malaysia

INF-11's characterization of herself as "the vehicle, not the engine" of job creation offers a theoretically significant perspective on the mediation structure. The account disaggregates the job creation pathway into two stages: NDE activity creates the organizational vehicle that converts external demand into employment relationships, while institutional programs, in this case public procurement set-asides for small enterprises, provide the demand trigger activating the vehicle's job-creating capacity. This insight extends the mediation model by identifying a second-order institutional pathway through which policy can amplify the NDE-to-job-creation transmission, complementing the regulatory quality and access-to-finance dimensions captured in the institutional support moderator.

The institutional moderation finding is substantiated with granular process-level detail by INF-04, who described the regulatory friction constraining the NDE-to-job-creation pathway in lower institutional quality contexts:

"When I look at the applications we receive, probably half of the entrepreneurs who come to us started their business at least two years before they registered formally. They were operating, maybe hiring informally, but they had not registered. When I ask why they did not register earlier, the answer is almost always the same combination: they did not know the process, or they found it too complicated, or they were afraid that registration would mean new tax obligations they could not manage. That regulatory ambiguity is a real barrier. Once they register, they can access financing, training, and contracts with larger companies. Before registration, they are invisible to the system, and the system is invisible to them. The jobs they create informally are also invisible."— INF-04, Entrepreneurship Program Administrator, Malaysia.

INF-04's account of the formalization barrier provides a direct mechanism-level explanation for the institutional moderation effect detected in Model 4 b. The two-year informality lag described means that the period during which necessity ventures have their greatest economic fragility and hiring potential is also the period during which they receive the least institutional support. The invisibility of informal employment to official statistics is also methodologically relevant: it implies the employer business entry rate may systematically undercount employment-generating effects of NDE in low-institutional-quality contexts, potentially attenuating the observed job creation coefficients in those sub-samples.

INF-07 offered a complementary perspective on how access to finance operationalizes the institutional moderation mechanism for necessity ventures in a lower-income context:

"Almost every necessity entrepreneur I have worked with hits the same ceiling. They grow to a point where they cannot grow further without capital, but commercial banks will not lend to them because they have no collateral, no credit history, and no formal accounts. Microfinance can bridge that gap, but only partially, because our loan sizes are often too small for what these businesses actually need

to hire and equip a second or third worker. The entrepreneurs who make it to employer status are almost always the ones who manage to access some kind of guarantee scheme, a government loan fund, or a buyer who pays in advance. Without that bridge financing, the venture reaches its ceiling and stays there, and the structural unemployment impact stalls."— INF-07, Microfinance Institution Manager, Indonesia

INF-07 articulates what might be termed a financing ceiling on the NDE-to-job-creation pathway: a point of arrested growth at which necessity ventures possess the market demand and managerial capacity to hire additional workers but lack the capital access necessary to execute that hiring. This ceiling is a specific institutional mechanism through which the general institutional quality moderation effect operates in lower-income contexts. INF-07's description of guarantee schemes and advance payment arrangements as enabling instruments for crossing the hiring threshold is consistent with the policy implications derived from the moderation analysis: interventions that specifically target the financing ceiling are more likely to amplify the employment-creating capacity of NDE than general motivational or planning training programs.

The human capital moderation finding was elaborated by INF-02, who drew an explicit contrast between his own educational background and that of other necessity entrepreneurs he observed in his local ecosystem:

"I was lucky, if you can call it that, in that when I had to start a business I had skills that people would pay for. My finance background helped me understand how to price a contract, manage cash flow, and talk to a bank. Many people who start businesses out of necessity do not have those skills. They can do the technical work but they cannot run a business. I have seen very capable tradespeople, builders, electricians, and mechanics who started on their own after losing employment and then failed not because there was no market for their work, but because they could not manage the administrative and financial side. The skill gap that kills necessity businesses is not usually technical; it is managerial."— INF-02, Necessity Entrepreneur (formerly finance sector), Indonesia

INF-02's identification of managerial rather than technical human capital as the binding constraint on necessity venture growth provides an important qualification to the aggregate Human Capital Index used in the quantitative models. The World Bank HCI primarily captures years of schooling and health-adjusted productivity, which are broad proxies for population-level capability. INF-02's account suggests the operative dimension of human capital for the NDE-to-job-creation pathway is specifically entrepreneurially-relevant managerial capability, including financial literacy, contract management, and administrative competence. This distinction has direct implications for policy design: the moderation coefficient estimated in Model 4 may be partially attenuated by the measurement gap between population-level human capital and venture-specific managerial capability.

INF-08 reinforced this mechanism from the supply-side perspective of program evaluation, connecting human capital moderation directly to measurable differences in employer-firm formation rates across education cohorts:

"The data from our national entrepreneurship surveys are quite consistent on this point. Necessity entrepreneurs who have completed at least secondary education and received some form of vocational or business training are two to three times more likely to register their business formally within the first eighteen months, and roughly twice as likely to hire at least one additional worker within three years, compared to necessity entrepreneurs with only primary education and no training. The gap is not about intelligence or effort. It is about whether the entrepreneur has the cognitive tools to navigate the formalization process, access credit, and plan beyond the next month. Human capital is not just about productivity; it is

the infrastructure of entrepreneurial capability.”— INF-08, Policy Researcher, Malaysia

INF-08's characterization of human capital as the infrastructure of entrepreneurial capability provides an individual-level empirical complement to the aggregate moderation coefficients estimated in Model 4. The two-to-three-times higher formalization rate among educated necessity entrepreneurs directly instantiates the mechanism through which human capital amplifies the NDE-to-job-creation pathway: educated necessity entrepreneurs are more capable of navigating the institutional barriers to formalization that INF-04 identified, and their higher formalization rate then enables access to the financing and market linkages that INF-07 identified as necessary for crossing the employer-hiring threshold. The interlocking nature of the institutional and human capital moderators, with human capital enabling institutional navigation and institutional support amplifying human capital returns, suggests a theoretically significant interaction between the two moderators that the aggregate interaction terms cannot fully capture and that merits attention in future individual-level analysis.

Robustness Checks

The primary findings are broadly consistent across several robustness checks. Substituting youth long-term unemployment for the primary structural unemployment measure produces coefficients with the same sign and comparable magnitude. Restricting the sample to the pre-COVID period (2013–2019) also yields results consistent with the baseline estimates, suggesting that the findings are not driven solely by crisis-period observations.

Sub-sample analysis by income group indicates that the association between NDE and structural unemployment is larger and more precisely estimated in upper-middle-income countries than in high-income countries. This pattern is consistent with the argument that NDE may have greater labor-market adjustment relevance in contexts where formal employment opportunities are more constrained but institutional capacity is sufficient to support venture formalization and growth.

System GMM estimates provide additional robustness evidence. The Hansen J-statistic does not reject instrument validity ($p = 0.42$), and the Arellano-Bond AR(2) test fails to reject the null of no second-order autocorrelation ($p = 0.18$). The GMM coefficient on NDE ($\beta = -0.201$) is slightly larger in absolute magnitude than the fixed-effects estimate ($\beta = -0.187$), suggesting that the baseline models may be conservative. Alternative operationalizations of institutional support and human capital also produce qualitatively similar moderation patterns, because the data are observational, these robustness checks should be interpreted as strengthening confidence in the consistency of the associations rather than as eliminating all endogeneity concerns.

The empirical results advance the entrepreneurship-unemployment nexus literature in three interconnected directions. First, the results suggest that the necessity-versus-opportunity distinction matters empirically: isolating the NDE component shows a distinctive association with structural unemployment. Second, the partial mediation results identify job creation as the primary but not exclusive transmission mechanism, providing evidence consistent with the search-and-matching argument while also aligning with the multi-mechanism character of NDE's labor-market relevance. Third, the moderation findings help clarify the conditions under which the optimistic and pessimistic views of NDE are more likely to apply. Rather than resolving the debate conclusively, the results suggest that NDE is more likely to be associated with productive labor-market adjustment when institutional

support facilitates formalization and financing access, and when human capital equips necessity entrepreneurs with managerial capabilities. Conversely, in weaker institutional and lower-capability contexts, NDE may remain closer to survivalist self-employment.

Several alternative explanations should also be considered. Countries with stronger institutions and higher human capital may simultaneously possess more dynamic labor markets, better social protection systems, and more effective active labor-market policies, which may also be associated with lower structural unemployment. Although the models include fixed effects, year effects, controls, and GMM robustness checks, unobserved time-varying country-level reforms may still affect both NDE and unemployment outcomes. The results should therefore be interpreted as conditional associations consistent with the proposed theoretical mechanism rather than as definitive causal proof.

INF-10, the regional development officer, offered a synthesis-level perspective that maps closely onto this theoretical resolution:

"I have spent fifteen years working with small businesses that started from displacement, from people who lost jobs in the coal industry, the automotive sector, the public sector. What I have concluded is that the potential is nearly always there. The people are capable, the market is often there, and the motivation is definitely there. What varies is whether the environment lets that potential turn into something real. Where we have invested in simplified business registration, accessible guarantees, and proper business advisory services, I have watched whole communities restructure around small business activity that started from unemployment. Where those things are missing, the activity stays informal and fragile, and the unemployment problem stays. The difference is institutional architecture, not entrepreneur quality." — INF-10, Regional Development Officer, Indonesia

INF-10's synthesis, drawn from practitioner experience with displaced-worker entrepreneurship, helps interpret the institutional moderation argument. The account suggests that institutional architecture may shape whether necessity-based activity is more closely associated with formal labor-market adjustment or remains closer to informal survival self-employment. This qualitative evidence provides additional contextual support for interpreting the moderation pattern, but it should not be read as statistically representative confirmation of the panel results.

The policy implications should be interpreted as conditional and exploratory rather than prescriptive. The institutional moderation findings suggest that regulatory simplification, accessible business formalization services, advisory support, and small-venture financing mechanisms may be more likely to support the movement of some necessity ventures toward formal employer activity. These interventions should not be presented as direct solutions for structural unemployment, they may function as part of a broader labor-market adjustment infrastructure when combined with demand-side opportunities, managerial capability development, and supportive institutional conditions.

INF-12 offered a precise characterization of the sequencing logic required for effective intervention design:

"The programs that fail are the ones that start by teaching people how to write a business plan. The programs that work start by removing the obstacles that prevent people from formalizing what they are already doing. Most necessity entrepreneurs are not pre-entrepreneurial. They are already operating businesses. They are already generating some employment. The intervention needed is not to teach them to start; it is to give their existing activity a legal identity, a bank account, and a pathway to contracts with larger organizations. Once those three things are in place, the

growth trajectory changes fundamentally. Without them, you are just improving the decoration on a survival strategy.”— INF-12, NGO Director, Informal Economy Formalization Program, Indonesia

The formal-sector measurement strategy should be interpreted with caution. Employer business entry may understate employment-related activity associated with NDE, especially in contexts where informal hiring, delayed registration, and hybrid livelihood strategies are common. This does not invalidate the proxy, but it limits the interpretation of the mediation results to the formal employer-entry channel. The findings should therefore be read as evidence consistent with one measurable pathway rather than as a complete account of all employment outcomes connected to necessity entrepreneurship (Lim et al., 2024; O'Donnell et al., 2024).

The results refine the role of human capital in the proposed moderated mediation framework. Human capital does not operate only as a general background condition; rather, it appears to condition two analytically distinct associations. First, the positive NDE $\times$ human capital interaction in Model 4a suggests that higher human capital strengthens the association between necessity-driven entrepreneurship and formal employer entry. This supports the view that skills, managerial capability, and productive knowledge improve the likelihood that necessity ventures move beyond survival self-employment. Second, the negative NDE $\times$ human capital interaction in Model 4b suggests that, after accounting for formal job creation, the association between NDE and lower structural unemployment is stronger in higher-human-capital contexts. This may reflect broader adjustment mechanisms, including more effective sectoral reallocation, stronger adaptive capacity among displaced workers, and greater productivity among necessity ventures. These findings should be interpreted as conditional associations rather than definitive causal effects because the study relies on observational cross-country panel data.

At the capability development level, the human capital moderation finding implies that vocational retraining programs for structurally displaced workers that combine occupational skills with entrepreneurship competencies, including business planning, financial management, and market analysis, may support stronger structural unemployment reductions than programs focusing on one or the other dimension alone. The human capital moderation result implies that investments in entrepreneurship education and training for displaced workers may contribute to labor-market adjustment by improving the likelihood that necessity ventures survive, formalize, and create employment.

Countries with stronger institutions and higher human capital may also have more dynamic labor markets, better social protection systems, stronger active labor-market policies, and broader economic resilience. Although the models include fixed effects, year effects, controls, and system GMM robustness checks, unobserved time-varying reforms may still influence both NDE and structural unemployment. The findings should therefore be interpreted as conditional associations consistent with the proposed mechanism rather than definitive causal proof.

Several alternative explanations should be considered when interpreting these findings. Countries with stronger institutions and higher human capital may also have more dynamic labor markets, better social protection systems, stronger active labor-market policies, broader access to finance, and greater macroeconomic resilience. These contextual advantages may influence both the prevalence of necessity-driven entrepreneurship and the level of structural unemployment. Although the models include country fixed effects, year fixed effects, macroeconomic controls, and system GMM robustness checks, unobserved time-varying

reforms may still shape the estimated associations. The findings should therefore be interpreted as conditional associations consistent with the proposed mechanism rather than as definitive evidence that NDE causally is associated with structural unemployment.

Conclusion

This study examined whether necessity-driven entrepreneurship is associated with structural unemployment through the pathway of job creation and whether this relationship varies across institutional and human-capital conditions. Using cross-country panel data from 45 countries over 2013–2023 and qualitative interviews with 12 informants, the study finds evidence consistent with a conditional adjustment mechanism. NDE is negatively associated with structural unemployment and positively associated with formal employer entry, while job creation partially mediates the NDE–structural unemployment relationship. The results further suggest that institutional support and human capital strengthen these associations, indicating that necessity entrepreneurship is more likely to contribute to productive labor-market adjustment when entrepreneurs can access formalization pathways, finance, advisory support, and managerial capabilities.

The qualitative findings help interpret these patterns by illustrating how formalization barriers, financing constraints, and managerial capability gaps shape the transition from self-employment to employer-firm formation. These interviews should be interpreted as contextual mechanism evidence rather than statistically representative confirmation. The quantitative and qualitative findings suggest that NDE may contribute to structural unemployment reduction under enabling conditions, but it is unlikely to do so automatically or uniformly across contexts.

The study has several limitations. First, job creation is measured through formal employer business entry, which may understate employment-related activity occurring through informal hiring or delayed registration. Second, although lagged variables, fixed effects, controls, Driscoll-Kraay standard errors, and system GMM robustness checks may be more likely to some endogeneity concerns, the observational design does not establish definitive causality. Third, the country sample is constrained by data availability, and the qualitative sample is purposive rather than statistically representative. Future research should use firm-level or individual-level longitudinal data to examine how necessity ventures evolve over time, when they formalize, and under what conditions they move from self-employment into employer-firm activity.

Author contributions

Author was responsible for the conceptualization of the study, literature review, research design, data compilation, quantitative analysis, qualitative interview design and interpretation, manuscript drafting, revision, and final approval of the submitted version.

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