

Original Article

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Examining the effect of investment in housing on employment in Lorestan Province

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Abstract

Despite its significant economic capacity, Lorestan Province has always faced an unemployment rate higher than the national average and is considered one of the country's immigrant-sending provinces. Given the labor-oriented nature of the housing sector and its potential to create employment, this study examines the effect of investment in the housing sector on employment in Lorestan Province from 2000 to 2024 using the autoregressive distributed lag (ARDL) model. The results show that, contrary to short-term theoretical expectations, investment in the housing sector has had a negative and significant effect on employment in Lorestan Province, considering the index of the number of building permits issued. This result may be related to specific housing market conditions and the province's economic structure; factors that have prevented the housing sector's potential employment-generation capacity from being fully converted into actual employment. Therefore, given the province's conditions, realizing these capacities requires identifying and removing structural and executive obstacles to investment in this sector; otherwise, any policymaking in the field of housing will be ineffective, and the gap between the current and desired situation will remain.

Keywords

Employment
housing investment
Lorestan
ARDL

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1. Introduction

Unemployment, as a preeminent socioeconomic challenge, has consistently captured the attention of policymakers and economists. The unemployment rate is a vital indicator of an economy's capacity to generate job opportunities for the active labor force and a primary metric for evaluating labor market efficiency and the overall efficacy of economic policies (International Labour Organization, 2021). In the Iranian economy, this issue, particularly in less-developed provinces, has emerged as a critical

structural concern. Lorestan province, with unemployment rates consistently exceeding the national average, exemplifies this unfavorable trend, as its economic sectors have largely failed to mitigate this persistent problem or effectively absorb the labor force (Statistical Center of Iran, 2024). To better understand this disparity and its historical trajectory, Figure 1 illustrates the unemployment rate in Lorestan province compared to the national average from 2000 to 2024.

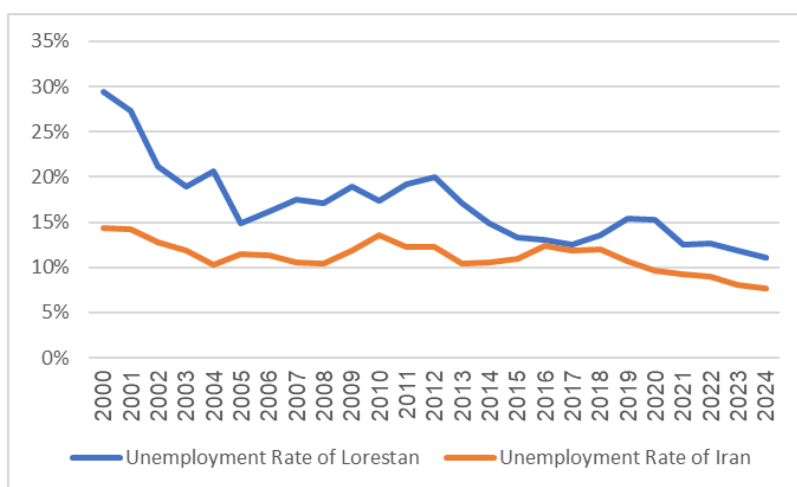


Figure 1. Comparison of the unemployment rate in Lorestan province and the national average

As illustrated in Figure 1, the unemployment rate in Lorestan province has remained consistently higher than the national average throughout the study period. Although this rate has decreased in recent years, the gap between the provincial and national averages remains significant.

Conversely, the housing and construction sector, a pivotal component of the economy, has significant potential to create jobs and reduce unemployment. This sector not only satisfies one of the most fundamental human needs, shelter, but also functions as a highly integrated asset, maintaining strong forward and backward linkages with other economic sectors and serving as a vehicle for wealth accumulation and income generation (Gholizadeh, 2019; Mozaffari & Ahmadzadeh, 2022). Consequently, among various asset classes, housing stands out as one of the most crucial socioeconomic indicators (Asadpour, 2019).

However, despite the housing sector's significance in the Iranian economy, the nexus between construction investment and employment is complex. In specific economic contexts, the growth rate of construction

investment has had no statistically significant impact on the unemployment rate, with current unemployment being primarily driven by its own previous values (autocorrelation). Furthermore, while projects such as the 'Mehr Housing' scheme increased employment in the construction sector, they failed to yield a significant net effect on aggregate employment due to the 'crowding-out' effect and labor reallocation from other sectors. In other words, employment gains in construction were largely offset by contractions in other economic sectors (Saka & Moyanga, 2024; Tajrishy & Vesal, 2024).

Accordingly, this study seeks to address the existing research gap concerning the nexus between housing investment and employment within Lorestan province. For the first time, this research empirically investigates the impact of housing investment, proxied by the key indicator of construction permits, on employment in the province from 2000 to 2024. The fundamental research question addressed herein is: has investment in the housing sector successfully fostered employment growth in Lorestan, or have structural constraints and

prevailing economic conditions mitigated the potential positive effects of such investments?

The remainder of this paper is structured as follows: following the introduction, the second section reviews the theoretical framework, while the third section examines the existing literature. The fourth section details the research methodology, including the econometric model, variables, and data. The fifth section presents the empirical findings and estimation results. Finally, the sixth section is dedicated to discussion, conclusions, and policy recommendations.

2. Theoretical foundations

Labor has consistently been recognized as a pivotal element in the production process, playing a decisive role in economic growth and dynamism. Given the profound and widespread adverse consequences of unemployment on socio-economic development, governments frequently implement policies aimed at economic expansion and production enhancement to boost employment and achieve long-term macroeconomic objectives (Saka & Moyanga, 2024). Consequently, full employment has remained a primary objective for policymakers across all societies, as unemployment not only undermines economic foundations but also exacerbates poverty, inequality, declining productivity, and social instability (Totan et al., 2013).

Within this context, the housing sector has long attracted attention due to its extensive linkages with other economic activities and its inherent job-creation capacity. Since the 1970s, investment in housing has been highlighted as an effective driver of economic growth. Since then, construction activities have been emphasized not only as an economic undertaking with a significant multiplier effect on economic growth but also for their broad socio-economic benefits. From a macroeconomic perspective, given that the housing sector accounts for 21% to 24% of the nation's GDP (during both the construction and operational phases), this sector acts as a potential engine for economic growth and employment (Amiri, 2011; Mozaffari & Ahmadzadeh, 2022).

Because of its labor-intensive nature, the construction industry has consistently been regarded as one of the most efficient platforms for job creation. In this framework, human labor is considered the primary factor of production; notably, the share of labor costs typically accounts for 25% to 60% of total project costs (Bentall, 1999; Mozaffari & Ahmadzadeh, 2022). In other words, labor-intensive projects that use locally

available inputs such as materials, simple tools, and local labor generate more direct and indirect employment opportunities and higher local income compared to high-tech programs reliant on imported technology and equipment (Thwala, 2005). Put differently, executing civil and construction projects using these methods can increase employment generation per unit of cost by 300% to 600% compared to capital-intensive approaches (McCutcheon, 1999). Accordingly, investment in the construction sector can influence employment through multiple transmission channels:

Direct employment: the primary and most significant channel through which construction investment affects employment is the direct creation of jobs within construction projects. This encompasses the entire workforce directly engaged in on-site construction operations, including laborers, engineers, technicians, and supervisors (Garin, 2019). Given the labor-intensive nature of the construction industry, a significant proportion of project expenditure goes to wages, thereby facilitating substantial job creation at relatively low unit cost.

Indirect employment: the second channel is indirect employment, generated through supply chains and the backward linkages between the construction sector and other economic activities. Implementing construction projects stimulates demand for construction materials (such as cement, steel, bricks, and aggregates), as well as engineering and consulting services, transportation, and other ancillary services. This, in turn, drives employment growth within supplier industries (Thwala, 2005; Saka & Moyanga, 2024).

Induced employment: the third channel, induced employment, arises from increased consumption expenditure of workers employed within the construction sector and its supplier industries. Income generated through both direct and indirect employment increases demand for goods and services across the broader economy, thereby stimulating further job creation in those sectors (Moretti, 2010). However, increased public investment in the housing sector may inadvertently crowd out private investment. By absorbing limited resources such as land, credit, and raw materials, public projects compete directly with the private sector, discouraging private developers or leading them to scale back their operations. Evidence suggests that, on average, every unit of 'Mehr Housing' constructed in Iran has displaced 0.5 units of private housing. The 'crowding-out effect'

negatively impacts not only investment but also employment. Since the private sector typically exhibits greater operational flexibility and employs more labor-intensive methodologies than the state, the displacement of private projects by government-led initiatives can lead to an overall contraction in construction sector employment (Tajrishy & Vesal, 2024).

Accordingly, the construction industry in developing nations faces a myriad of challenges that may undermine its capacity for job creation (Iheme & Chiagorom, 2018; Thwala, 2005). Key challenges include:

1. Deficiencies in public policy: the adverse impact of government policies and excessive state intervention in construction demand, which fosters volatility and hinders sustained employment.
2. Macroeconomic volatility: factors such as inflation, exchange rate fluctuations, and economic recessions, which increase the risk associated with investment in the construction sector.
3. Escalating construction costs: rising costs related to building materials, labor, and land, which diminish the economic viability of construction projects (Saka & Moyanga, 2024).

Despite possessing abundant natural resources, diverse climates, water wealth, fertile plains, numerous mines, a young workforce, and significant tourism potential, Lorestan province has not secured an optimal standing within the national economy. In recent years, the province has failed to capture a share of national production and employment commensurate with its inherent capabilities and potential (Sepehrdoust & Barouti, 2018). Notably, the unemployment rate in Lorestan reached 11.9% in the winter of 2025, compared to the national average of 7.6%, highlighting a precarious labor market situation in the province. Furthermore, the sectoral composition of the provincial economy has shifted: the service sector's share increased from 51.4% to 54.4%, whereas the industrial sector's share declined from 26.1% to 24.0%, and the agricultural sector's share decreased from 22.6% to 21.6% (Statistical Center of Iran, 2025). Among the most critical drivers of this provincial inefficiency are the uneven spatial distribution of industrial activities, the geographical mismatch in labor demand, and the low share of high-tech industries within the provincial industrial landscape, which diminishes the demand for specialized labor. Furthermore, the younger generation's reluctance to pursue agricultural activities, leading to rural-to-urban

migration compounded by a pervasive informal economy and the absence of firm-level workforce training programs, constitutes significant weaknesses in the province's employment-generation trajectory (Sepehrdoust & Barouti, 2018).

The housing sector has not been insulated from these adverse conditions. Large-scale housing initiatives in Lorestan, such as the National Housing Movement and Mehr Housing, have faced stagnation and suspension despite their commencement, primarily due to obstacles such as untimely disbursement of bank credit (PersianSazeh, 2025). Furthermore, migration and population growth shifts are among the paramount factors influencing effective housing demand (Jalalian et al., 2016). Lorestan province has consistently recorded the highest net-negative migration rates across successive census periods. This indicates that out-migration volume significantly exceeds in-migration, classifying Lorestan as one of the country's prominent out-migration hubs. The consequences include the depletion of young and skilled labor, an aging demographic, diminished housing demand, and ultimately, the erosion of the province's productive and employment-generating capacities (Statistical Center of Iran, 2017). In other words, the exodus of the population, particularly among the skilled and young workforce, has constrained the supply of active human capital. This has two adverse effects: first, it dampens effective demand for housing and undermines market dynamism; second, it erodes the productivity and production potential of the local economy and creates a self-perpetuating cycle of unemployment and subsequent out-migration.

3. Empirical review

3.1. Domestic studies

Gholizadeh and Barouti (2011), in their study titled 'The effect of residential and non-residential investment on GDP in an open economy: A case study of Iran,' employed a vector error correction model (VECM) and generalized impulse response functions (GIRF) using quarterly data from 1991 to 2007. Their findings suggest that while non-residential investment has a greater influence on GDP in a closed economy, residential investment predominates in an open economy (given net exports). Furthermore, consumption and government expenditure emerged as the most influential variables across both models. Shahbazi and Kalantari (2012) examined the impact of monetary and fiscal policy shocks on housing market

variables in Iran using a structural vector autoregression (SVAR) model and quarterly data from 1991 to 2008. The results indicate that in the short run, monetary and fiscal policies are ineffective tools for controlling housing prices; however, in the long run, money supply and government expenditure play a significant role. Additionally, they noted that fiscal policy is less effective in controlling housing investment and the volume of housing starts, whereas monetary policy remains a potent instrument for these variables.

Sepehroust and Barouti (2018), in their study on employment trends in Lorestan province, applied shift-share analysis to data spanning 2001 to 2011. Their results demonstrated that employment growth in the province was decoupled from national trends, a misalignment attributed to negative structural and competitive shifts. Furthermore, based on the location quotient (LQ) coefficient, the agricultural sector (LQ=1.81) was identified as a basic sector with comparative advantage, whereas the industrial (LQ=0.79) and service (LQ=0.85) sectors were classified as non-basic, exhibiting trends contrary to national comparative advantages.

Khooshegol Garusi and Afshari (2020) investigated the impact of four macroeconomic shocks (monetary, fiscal, oil revenue, and exchange rate) on housing investment in Iran (1978–2017) using a Bayesian vector autoregression (BVAR) model. Their findings reveal that monetary shocks exhibit the highest persistence, while oil revenue shocks show the lowest. Furthermore, the volatility of housing investment was found to be most significantly affected by fiscal shocks, followed by monetary, exchange rate, and oil revenue shocks, in descending order.

Piri et al. (2024), in their study on appropriate urban housing investment models in the Ahvaz metropolis, employed qualitative content analysis (using ATLAS.ti) and the Delphi method. Their findings identify environmental issues, specifically water crises and drought, as primary impediments to achieving an optimal housing investment model. Conversely, policy interventions such as transitioning from percentage-based brokerage commissions to fixed fees, redeveloping brownfield sites, and relocating industrial and warehouse zones outside city limits were identified as effective strategies for enhancing domestic capacity and regulating the housing market. Tajrishy and Vesal (2024) investigated the local employment effects of low-income housing construction in Iran using a generalized difference-in-differences (DiD) approach on building permit data

and labor statistics from 2005 to 2019. Their results show that while each 'Mehr Housing' project directly increases construction sector employment by approximately five jobs (or 230 hours per week), the policy does not significantly impact aggregate employment. This is attributed to a 50% crowding-out effect on private construction and labor reallocation from other sectors, rendering the policy, in effect, a zero-sum game.

3.2. Foreign studies

Thwala (2005), in a study titled 'Employment creation through public infrastructure construction and maintenance in South Africa,' employed a descriptive-analytical approach to evaluate labor-intensive employment programs based on the experiences of various African nations between the 1960s and 2000s. The findings demonstrate that labor-intensive methods significantly increase employment per unit of expenditure; however, the South African experience highlights that such programs are susceptible to failure due to institutional weaknesses, the lack of long-term planning, and political instability.

In their study 'Assessing the employment effects of housing investment in Ghana,' Abbadi et al. (2019) used a social accounting matrix (SAM) and output multipliers to analyze the employment generation potential of social housing projects (2017–2018). Their findings indicate that every \$1 million invested in social housing generates 112 full-time jobs, with a labor intensity estimated at 41%. Furthermore, for every direct job created in the construction sector, an additional 5.3 jobs are generated in linked sectors.

Christou et al. (2019), in their study titled 'The time-varying impact of uncertainty shocks on the U.S. housing market,' employed a time-varying parameter vector autoregression (TVP-VAR) model with quarterly time-series data from 1963 to 2014. Their results show that uncertainty shocks negatively affect housing variables, and the cumulative response of these variables to such shocks fluctuates significantly across various time horizons.

Saka and Moyanga (2024) investigated the impact of construction investment on unemployment in Nigeria using multiple regression and an autoregressive distributed lag (ARDL) model, based on World Bank Development Indicators from 1991 to 2020. Their findings reveal that the only statistically significant predictor of current unemployment is the previous year's unemployment rate. Notably, neither the

growth rate of construction investment nor the economic growth rate significantly affected current unemployment, a finding that stands in contrast to Okun's Law.

Abou Elseoud and Al-Hosani (2025), in their research titled 'Foreign direct investment in real estate and construction: drivers of sustainable economic growth in Bahrain,' employed an ordinary least squares (OLS) regression on simulated quarterly data from 2019 to 2023. Their results show that a 10% increase in foreign direct investment (FDI) inflows is associated with a 3.8% growth in the housing sector's GDP, alongside measurable improvements in both housing supply and employment.

A review of both domestic and international literature indicates that while the economic impacts of the housing sector have been examined from various perspectives, academic inquiry has primarily concentrated on the effects of housing investment on production and macroeconomic variables, the determinants of housing investment, and general housing market dynamics (Gholizadeh & Barati, 2011; Shahbazi & Kalantari, 2012; Khoshegel-Gharousi & Afshari, 2020; Piri et al., 2024). In contrast, research specifically addressing the direct nexus between construction activities and employment remains limited. For instance, Tajrishy and Vesal (2024), in their investigation of the "Mehr Housing" project's impact on local employment, demonstrated that increased construction activity does not necessarily translate into aggregate employment growth, as crowding-out effects and labor displacement can mitigate the anticipated positive outcomes. International evidence is equally heterogeneous; while Abadi et al. (2019) report substantial employment-generating effects for housing investment, Saka and Moyanga (2024) found no statistically significant relationship between construction investment growth and unemployment reduction. Consequently, while existing evidence acknowledges the importance of the housing sector in job creation, it suggests that the magnitude and significance of this relationship is highly contingent upon specific economic conditions and regional characteristics.

Among domestic studies, Sepehri-Doust and Barooti (2018) examined the status and dynamics of employment in Lorestan province. Their focus remained on employment structure and its drivers rather than the specific relationship between housing investment and provincial employment. Furthermore, existing domestic studies on housing investment have predominantly been conducted at the national level.

These findings cannot necessarily be generalized to provincial contexts due to significant variances in economic structures, construction capacities, and labor markets. Consequently, the research gap lies in the absence of empirical evidence regarding the impact of housing investment on employment at the provincial level, specifically in Lorestan, a gap not directly addressed in prior literature, even where housing and employment have been studied separately within the province.

Accordingly, this study focuses on Lorestan province and empirically investigates the impact of housing investment on employment using provincial time-series data. The primary innovation of this research lies not merely in examining housing-led employment, but in shifting the level of analysis from the national to the provincial scale and empirically testing this relationship within the specific economic and labor market framework of Lorestan. Furthermore, the number of construction permits issued is used as a proxy to gauge housing investment activity, providing a systematic and measurable indicator of construction efforts at the provincial level. Thus, this study aims to complement existing evidence on the relationship between housing investment and employment while providing region-specific insights to inform employment policy and housing sector planning in Lorestan province.

4. Methodology

To investigate the dynamic relationships between the variables, this study employs the autoregressive distributed lag (ARDL) approach. This methodology, originally introduced by Pesaran and Shin (1999) and subsequently refined by Pesaran et al. (2001), offers several distinct advantages. A key feature of this approach is determining optimal lag lengths for each explanatory variable based on information criteria such as the Akaike (AIC), Schwarz-Bayesian (SBIC), or Hannan-Quinn (HQIC), which effectively mitigates potential estimation bias.

One of the primary benefits of the ARDL framework over alternative cointegration techniques, such as the Johansen procedure, is its flexibility regarding the order of integration of the variables; it allows for the analysis of variables regardless of whether they are stationary (I(0)) or non-stationary (I(1)). Furthermore, this method accommodates endogeneity, facilitates the bounds testing procedure even with limited sample sizes, and provides consistent and efficient estimates of both short-run and long-run coefficients (Alaee, 2021). Because the transmission mechanism of

economic shocks is often time-dependent and not instantaneous, some effects manifest in the current period while others materialize with lags. Consequently, models designed to capture such delayed effects are classified as distributed lag models (Souri, 2021).

This study employs an empirical-analytical approach using time-series data to investigate the impact of housing sector investment on employment in Lorestan province from 2000 to 2024. The conceptual framework and econometric model are developed based on the adapted model of Saka and Moyanga (2024), tailored to the region's specific economic conditions.

The dependent variable is defined as the number of employed individuals in Lorestan, while the primary independent variable is the number of issued building permits, serving as a proxy for housing investment. To control for macroeconomic shocks, the provincial value-added and the inflation rate are incorporated as control variables within the model. Accordingly, the baseline econometric specification is formulated as Equation (1):

$$EMP_t = \beta_0 + \beta_1 BPT_t + \beta_2 \ln(VAt) + \beta_3 INF_t + U_t \quad (1)$$

In the model specified above, the intercept, the coefficients of the independent variables (regression slopes), and the error term are denoted by β_0 , β_i , and U_t , respectively.

The variables are defined as follows:

Employment (EMP): this variable represents the total number of employed individuals in Lorestan province, defined as persons aged 10 years and older who worked for at least one hour during the reference week, whether in paid or unpaid employment. Data are sourced from the Statistical Center of Iran (SCI).

Building permits (BP): this variable captures the number of construction permits issued by municipalities and other authorized entities, categorized by land use (residential, industrial,

educational, commercial, healthcare, and others). The data are retrieved from the Statistical Center of Iran.

Value added (VA): this represents the surplus value generated by production across Lorestan's economic sectors (agriculture, industry, and services), net of indirect taxes, measured in millions of Rials. Data are obtained from the Statistical Center of Iran.

Inflation rate (INF): To measure inflation, the consumer price index (CPI) with a base year of 2016 (1395) is employed, which reflects fluctuations in the price of a fixed basket of goods and services. The data are sourced from the Central Bank of the Islamic Republic of Iran.

All variable definitions strictly adhere to the standards and protocols established by the Statistical Center of Iran. Furthermore, in line with standard econometric practices and to ensure robust diagnostic criteria, such as coefficient significance and residual stationarity, inflation and employment are expressed as rates and percentages, respectively. The value-added variable is log-transformed to facilitate elasticity interpretation. Conversely, the number of building permits is included in its level form to maximize explanatory power. All data analysis and model estimation were conducted using EViews 13.

5. Research findings

Before model estimation, it is essential to examine the variables' stationarity. Stationarity is a fundamental assumption in time-series econometrics and plays a decisive role in the validity of the estimation results. Since non-stationarity in time-series data can lead to spurious regression and invalid statistical inferences, unit root tests before model estimation are an unavoidable prerequisite. Accordingly, this study employs the Phillips-Perron (PP) unit root test, a robust standard procedure, to assess the stationarity of all variables. Table 1 shows this test's results.

Table 1. Results of unit root tests

Variable	t-statistic	5% critical value	P-value	Results
Emp	-1.130417	-2.991878	0.6864	I(0)
	-6.904104	-2.998064	0.0000	I(1)
Bp	-1.400198	-2.991878	0.5651	I(0)
	-6.260001	-2.998064	0.0000	I(1)
lnVa	2.022163	-2.991878	0.9997	I(0)
	-3.152894	-2.998064	0.0365	I(1)
Inf	-1.675980	-2.991878	0.4301	I(0)
	-3.022177	-2.998064	0.0476	I(1)

As presented in Table 1, the unit root test results indicate that all variables in the model are non-stationary in levels and exhibit unit roots. However, after first-order differencing, all variables achieve stationarity at the 95% confidence level. Consequently, the study proceeds to dynamic modeling and estimation using the autoregressive distributed lag (ARDL) approach.

5.1. Model estimation

To estimate the dynamic relationships, the autoregressive distributed lag (ARDL) approach was employed. The estimation results are presented in Table 2.

Table 2. Estimation of the short-run model

Variable	Coefficient	t-statistic	P-value
Constant	46.37570	3.055762	0.0075
Emp(-1)	0.700316	3.195937	0.0056
Bp	-0.001470	-2.876001	0.0110
lnVa	-2.427856	-2.158259	0.0464
Inf	0.010803	0.288946	0.7763
Inf(-1)	-0.090878	2.076819	0.0543
R-squared		0.804108	

The dynamic model estimation (Table 2) indicates that building permits (BP) and value-added (lnVa) have statistically significant negative effects on employment in Lorestan, with coefficients of -0.001 and -2.42, respectively. The negative coefficient for building permits suggests that an increase in permit issuance does not necessarily lead to employment growth in the province. This discrepancy is largely attributed to the prevalence of "idle permits" projects that are approved but never reach the execution phase. This phenomenon is linked inextricably to the province's economic conditions, characterized by stagflation in the housing market, soaring construction material and labor costs, and delays in allocating bank credit.

Similarly, the negative coefficient for value-added reflects the phenomenon of "jobless growth." During the study period, growth was driven more by price inflation and a structural shift toward capital-intensive sectors rather than an expansion of labor-intensive economic activities. Furthermore, the lagged inflation coefficient (-0.09), which is statistically significant at the 10% level, demonstrates that inflationary pressures on construction input costs and the subsequent decline in household purchasing power have undermined the employment-generating capacity of

the housing sector in the province.

Following the dynamic model estimation, the existence of a long-run relationship was investigated. Assessing the stability of long-run relationships among non-stationary time series necessitates robust econometric methods. Cointegration is a pivotal concept in this regard, offering an effective mechanism to avoid spurious regression in time-series analysis (Noferesti, 1999). If non-stationary time-series variables share a long-run equilibrium relationship, their long-term trajectories move in tandem. Such a relationship ensures that the regression estimates remain valid and that the test statistics (including F and t-statistics) are statistically reliable.

Pesaran, Shin, and Smith (2001) introduced the ARDL bounds test to evaluate long-run cointegration. In this framework, two critical values (lower and upper bounds) are determined based on the number of variables. The lower bound assumes stationary regressors $I(0)$, while the upper bound assumes non-stationary regressors $I(1)$. Consequently, if the calculated F-statistic exceeds the upper critical bound, the null hypothesis of no cointegration is rejected, confirming the existence of a long-run relationship. The bounds test results are presented in Table 3.

Table 3. ARDL bounds test results

Test statistic	Value	K
F-statistic	3.882704	3
Critical values of the bounds		
Significance level	Lower bound I(0)	Upper bound I(1)
10%	2.676	3.586
5%	3.272	4.306
1%	4.614	5.966

Consistent with the results of the bounds test presented in Table 3, the calculated F-statistic is 3.88. This value exceeds the upper critical bound I(1) at the 10% significance level (3.586). Consequently, the null hypothesis of no cointegration is rejected, confirming a long-run equilibrium relationship among the

variables. Although the F-statistic falls within the inconclusive region at the 5% significance level, the long-run relationship is statistically supported at the 10% level. Subsequently, the long-run coefficients were estimated to analyze the long-term behavior of the variables. Table 4 presents these results.

Table 4. Long-run estimation results

Variable	Coefficient	t-Statistic	P-value
C (Intercept)	-614.4528	-0.264391	0.7943
Bp	0.019479	0.268277	0.7914
lnVa	32.16777	0.277927	0.7841
Inf(-1)	-1.347219	-0.257335	0.7997

Due to statistical limitations arising from the sample size and the specific nature of provincial data, the long-run coefficients estimated (Table 4) lack sufficient statistical significance at conventional levels (5% and 10%). This insignificance may be attributed to the limited number of observations and the influence of non-macroeconomic factors on employment within Lorestan. Variables such as changes in engineering regulatory frameworks, the prevalence of construction permits issued without implementation, skilled labor migration, stagflation, and the inefficiency of support policies are critical determinants that standard macroeconomic models cannot quantify. These factors likely play a pivotal role in diminishing the effectiveness of investment on employment. Consequently, given the lack of statistically significant long-run coefficients and the robustness of the ARDL approach in short-run

analysis, this study primarily focuses on the model's short-run dynamics.

5.2. Classical assumptions

Parallel to the national economy, Lorestan province's economy has been subject to various structural shocks throughout the study period, including economic sanctions, oil price volatility, and socio-political institutional transitions. Consequently, assessing the model's structural stability is essential to adhere to fundamental econometric assumptions. As illustrated in Figure 2, the model exhibits robust structural stability, indicating that the estimated coefficients for Lorestan province have remained stable and have not undergone significant variations over the study period.

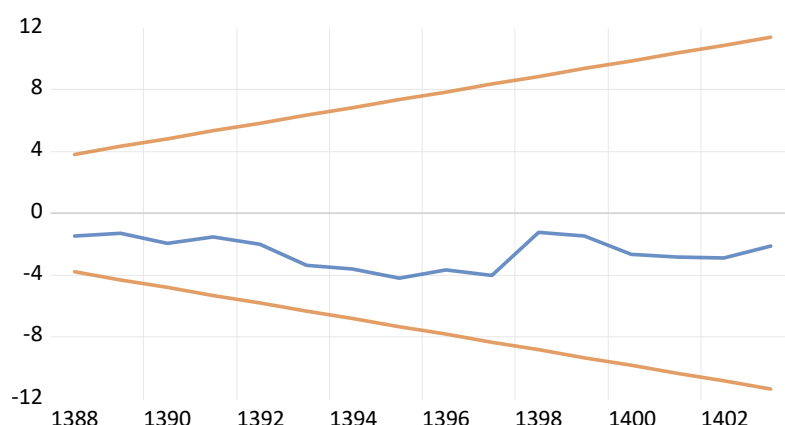


Figure 2. Structural stability chart

“Furthermore, the results of diagnostic tests including the Ramsey RESET test and tests for serial correlation, heteroskedasticity, and structural stability indicate that the model is correctly specified. In all four tests,

we fail to reject the null hypothesis, suggesting no evidence of functional form misspecification, serial correlation, or heteroskedasticity. These results are presented in Table 5.

Table 5. Classical assumptions test results

Results	Prob	t-statistic	Test type
The model is properly specified	0.2220	1.623114	Ramsey reset test
Absence of heteroscedasticity	0.8648	0.405317	Breusch-Pagan
No serial correlation	0.8559	0.157342	Breusch-Godfrey

6. Discussion and conclusion

This study aims to investigate the impact of housing investment on employment in Lorestan province. To this end, the number of issued building permits is used as a leading indicator of housing investment for the period spanning 2000 to 2024 (1379-1403 in the Iranian calendar), utilizing the autoregressive distributed lag (ARDL) approach. The short-run model specification indicates that, contrary to conventional theoretical expectations, building permit issuance has exerted a statistically significant negative effect on employment in Lorestan province. In other words, an increase in building permits has not been job-creating per se; rather, it has been associated with job-destroying consequences in the short run. This finding is consistent with studies by Saka and Moyanga (2024) in Nigeria and Tajrishi and Vesal (2024) in Iran on the challenges of generating sustainable employment in the housing sector.

Regarding the negative impact of building permits on employment in Lorestan, it can be argued that factors such as the low conversion rate of permits into actual construction projects, administrative complexities, the

untimely allocation of credit, prevailing stagflationary conditions, the sharp rise in construction costs and wages, the erosion of household purchasing power, and the province's phenomenon of outward migration have hindered employment generation. Consequently, permit issuance alone has failed to stimulate the demand for local labor. Furthermore, among the model variables, the negative coefficient for value-added underscores the deepening phenomenon of 'jobless growth' within the province's economic structure. The estimated long-run coefficients lacked statistical significance due to structural fluctuations and limited degrees of freedom in the provincial data; therefore, the short-run dynamics constitute the primary basis of this analysis.

Based on these findings, the following policy recommendations are proposed:

1. Implementing online monitoring systems for the physical progress of projects and establishing binding legal deadlines for the commencement of operations to increase the conversion rate of permits into construction and curb speculative behavior in the permitting market.

2. Reforming engineering regulations and streamlining administrative bureaucracies, alongside targeted tax incentives for housing developers to reduce construction costs.
3. Mandating the banking network to allocate credit lines and construction loans promptly at preferential interest rates to reduce the risk of stagnation and accelerate the completion of unfinished residential projects.
4. Developing support packages and economic incentives for local entrepreneurs and professionals to safeguard human capital and mitigate the negative migration flow of skilled labor.

Consequently, if structural challenges in the provincial executive and credit systems remain unaddressed, housing investment will not only fail to become an engine for employment but will continue to exacerbate existing job-destroying consequences. Therefore, structural reforms aimed at accelerating operational execution and resource management are a prerequisite for effective development policies in this sector. Otherwise, diversifying the regional economy and prioritizing sectors with higher employment elasticity (such as tourism and downstream processing industries) is necessary to achieve sustainable employment.

Authors' Contributions

All authors have contributed equally to the writing of this article.

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Conflict of Interest

The authors declare no conflict of interest.

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