Exploring the Role of Financial Development in Labor Market Volatility

Muzammil Hussain[1]Fahad Malik[2]Mahnaz Muhammad Ali[3]

1. University of Sargodha, Pakistan

Email: econ_muzammil@yahoo.com

2. Islamia University Bahawalpur, Pakistan

Email: Fahad.malik@iub.edu.pk

3. Islamia University Bahawalpur, Pakistan

Email: mahnaz.ali@iub.edu.pk

PAPER INFO	ABSTRACT
	The study explored the relationship of financial development at domestic and international level with volatility of labor market in Pakistan. To model the volatility in labor market the rolling standard deviation procedure of employment variable was used. The other control variables included in endeavor were trade openness, gross fixed capital and output growth. ARDL approach was employed for the estimation of cointegration relationship using annual data from the period 1973-2020. This research found a significant positive influence of financial markets on variables of labor market. The results have provided evidence founded on theory of financial fragility by Keynes (1936) and Minsky (1986). The negative value of ECM (-0.253) also shows convergence behavior and a meaningful speed of adjustment. The study suggested that growth in financial markets is needed to strengthen economic position of a country because it has a significant impact on labor market.

1 Introduction

Financial markets play a crucial role in shaping a firm's strategic decisions, and their influence can ripple through the labor market, affecting income fluctuations and labor dynamics. The recent global financial and economic crisis has left an indelible mark on many countries, causing an unprecedented surge in unemployment. This underlines the significant impact of financial markets on both workers and the broader economy. The Efficient Market Hypothesis underscores the importance of financial markets in mitigating risks for both workers and the overall economic stability.

Jayadev (2007) underscores the importance of financial development, both at the national and international levels, in influencing the demand for labor and diminishing labor's bargaining power. Keynes (1936), in his groundbreaking work on employment, interest, and money, shed light on the pivotal role of monetary markets. Stock markets, in particular, serve as a platform for investors to secure funds by offering stocks to the general public through investment banks (Hussain et al., 2015).

Buch and Pierdzoch (2013) discovered a positive relationship between financial integration and employment volatility, especially among low-skilled workers. However, prior research primarily concentrated on exploring the connection between financial progress and macroeconomic instability. Lei et al. (2023) further delved into this issue and found that in developing nations, increased labor market flexibility tends to mitigate adverse effects on non-tradable sectors, thus cushioning the impact on real GDP. This study represents a significant step in understanding the interplay between financial development and labor market stability.

Studies on the labor market have exposed a noticeable increase in wage and employment volatility, particularly among low-skilled laborers in recent decades. This challenge can be traced back to Rodrik's (1997) argument that trade growth intensifies competition, particularly for low-income countries, and poses a significant risk to unskilled workers.

The exploration of the association between financial growth and labor market instability has gained considerable attention in recent times. Historical records reveal that stock markets have weathered various financial crises during different periods, with the repercussions of these calamities spilling over into other markets, resulting in downturns in stock prices (Hussain et al., 2020). These adverse effects are often attributed to indicators such as total assets and liabilities, stock market capitalization, unemployment rates, trade openness, and the volatility of output growth, all of which are closely linked to monetary markets. This phenomenon affects both developed and developing economies, including Pakistan, which serves as the focus of this examination.

In short, Financial markets can significantly impact a firm's strategy, labor market fluctuations, and risk reduction. Financial crises can trigger unemployment and stock market downturns. Government policies, trade dynamics, and globalization play key roles. Indicators like assets, liabilities, and unemployment rate are interconnected. Economic development affects this relationship, and policy implications are crucial. Cross-country variations highlight the complexity of the financial-labor market connection.

The study posits that financial development, both domestically and internationally, may have amplified these effects in Pakistan. Consequently, the primary objective of this paper is to investigate the intricate relationship between monetary markets and the uncertainty within the labor market.

1.1   Objectives of Study

The general objective of present research is to examine the association of financial development at domestic and international level with volatility of labor market in Pakistan. Moreover, specific objectives are to model volatility in labor market and to find out its macroeconomic determinants.

1.2   Hypotheses of Study

H1: There exists volatility in labor market of Pakistan.

H1: Financial development at national and international level plays an important positive role in labor market volatility.

2   Literature Review

Gatti and Vaubourg (2005) identified the linkage of financial variables with unemployment and analyzed the method they interrelate with labor market associations. Researcher used data for 18 OECD countries for the time 1980-2004. Results showed that financial variables effectively depend on labor market perspective, an increase in market capitalization and decrease in banking concentration leads to reduce unemployment.

Onwioduokit et al., (2007) investigated the determinants of labor market occurring from the economic conversion, and how public policy influence outcomes of labor market in Nigeria. Seemingly Unrelated Regression was used to model the two equations for demand and supply. Labor force participation was determined by its own anticipation and demand elasticity whereas population growth and minimum wage were insignificant and directly associated with labor force participation. The results furthermore showed that demand was negatively related with supply of labor force and working age peoples.

Jerzmanowski and Nabar (2008) studied linkage between fiscal development and wage inequality in US. The researcher established a model to study influence of financial expansion on production, wage dispersion and innovation between different skilled workers. Using data from 1977 to 2006 this study

found that wages of college graduates increased by 0.5-1.2% while of high school qualification decreased by 2.2%. So, it was concluded that gains from financial development were more to skilled worker than less skilled.

Shabbir et al., (2012) investigated role of financial sector to reduce unemployment in Pakistan. Long run relationship was investigated through ARDL approach using the annual data from 1973-2007. The analysis showed that increase in financial sector activities has positive impact in reducing unemployment.

Zanetti (2012) examined the impact of financial shocks on labor market variables using general equilibrium approach. Using the quarterly observation from 1955:1-2010:2, outcomes showed that financial shock contain momentous effect on wages and unemployment.

Darcillon (2013) explored relationship among financial growth, employment volatility and welfare state institutions in 15 OECD countries. By using panel data from 1970 to 2007. The researcher employed fixed effect and IV-GMM approaches for the estimation purpose. It was found that financial development at national and international level was associated with high volatility in labor market. The marginal effects showed that social expenditures ever more reduce volatility of labor market by level of financial development particularly for low-skilled labor through reimbursement means.

Kilic and Wachter (2014) proposed a justification of labor market volatility based on time varying risk using inconsistent probability of an economic failure. The study described recession a time in which cash flows were discounted at a high discount rate and low growth. Study showed that financial markets and fall in investment results in further unemployment and influence the risk associated with labor market.

Guisinger (2017) discussed that greater provision for trade security between females redirects a normal reaction to concerns about service instability which accompanied by trade liberalization.

Brutger and Guisinger (2022) argued that trade induced employment instability and employment stability were flouted factors to explain gender division in approach. Due to fundamental insight and social standards, it was hypothesize that working ladies were more reactive to risk of trade associated occupation volatility than men.

Doornik et al., (2021) explored financial access and outcomes of labor market in Brazil. Researched examined employment and income effect of credit access by investment to labor mobility. Student found that by giving incentive employment increase and credit restrictions prevent individuals to become part of labor market.

Fonseca and Doornik (2022) investigated financial development and labor market effects in Brazil. This endeavor estimated the influence of access to bank credit on earnings and employment of high and low skilled labors. Study found that credit expansion directed to increase the skill strength of firms.

Lei et al., (2023) analyzed cross-country data including 130 regions and countries and regions from 2000-2019 to examine the association among financial crises, labor market and economic volatility. The findings demonstrated that financial crisis had a slighter impact on real GDP in developing states with flexible labor markets.

Teramoto (2023) studied unequal wage cyclicality: theory, evidence and implications for labor market volatility. The empirical study showed wage cyclicality strongly increased with level of wages, particularly during expansions and suggesting the nonexistence of a wage trickle-down effect.

3   Data and Methods

Pagano and Pica (2012) explained that more unstable labor markets show more innovative and active markets because it promotes the labor reallocation and diffusion in productivity. Instability in labor market is positively related with dispersion in earnings across workers. This study followed Rodrik (1997; 1998), methodology to measure instability of labor market by calculating rolling[1] standard deviation of employment in a five year window.

To capture domestic measurement of financial market the study used ratio of stock market capitalization to GDP and for international level asset and liabilities ratio to GDP is used. The other explanatory variables used in present research are trade openness, gross fixed capital formation and volatility of output growth.

Annual data from the period 1973-2020 is utilized to examine impact of financial market on labor market volatility. The sources used for data collection are State Bank of Pakistan, International Labor Organization and World Bank.

The general formation of model estimated in this study is as follow.

$$HT = \beta_0 + \beta_1 SMC + \beta_2 ALG + \beta_3 GFC + \beta_4 VGOP + \beta_5 TO + \varepsilon \tag{1}$$

Here,

HT……………………Instability in employment

SMC …………………Ratio of stock market capitalization to GDP

ALG…………………Asset and liabilities to GDP

GFC……………… .Gross fixed capital

VGOP……………...Volatility of output growth

TO…………………. Trade openness

ε_t……………………Error term

ARDL Approach

Autoregressive distributed lag (ARDL) approach used for cointegration introduced initially by Pesaran and Shin (1999) and advance extended by Pesaran et al., (2001). ARDL has the benefit that there is no need of all variables to be I (1) like Johansen framework and is applicable if series are I (0) and I(1) variables. Bound testing (F-test) is employed to test long run relationship between the variables. Bound testing approach is most appropriate procedure for small samples and applicable whichever integration order is.

   The general form of unrestricted ECM model is

$$dHT_i = a_o + \sum_{i=1}^{p} B_i dHT_{t-i} + \sum_{i=0}^{q} C_i dSMC_{t-i} + \sum_{i=0}^{r} D_i dALG_{t-i} + \sum_{i=0}^{s} E_i dGFC_{t-i} + \sum_{i=1}^{t} F_i dVGOP_{t-i} +$$

$$\sum_{i=0}^{u} G_i dTO_{t-i} + \delta_1 HT_{t-i} + \delta_2 SMC_{t-i} + \delta_3 ALG_{t-i} + \delta_4 GFC_{t-i} + \delta_5 VGOP_{t-i} + \delta_6 TO_{t-i} + u_i \tag{5}$$

Now,

- "d" represent difference operator

---

[1] $\sigma(Z_{it}) = \frac{1}{5}\sqrt{\sum_{k=0}^{4}(Z_{i,t+k} - \bar{Z}_{t+k})^2}$

- Coefficients Bi, Ci, Di, Ei, Fi and Gi, represents short-run dynamics.

- Coefficients like δ1, δ2, δ3, δ4, δ5 and δ6 are for long term relationships.

- u_t for error term

After the co-integration test in ARDL (p, q, r, s ,t, u) structure, next the long-run ARDL(p, q, r, s, t, u) model was estimated.

$$HT_t = a_1 + \sum_{i=1}^{p} B_i HT_{t-i} + \sum_{i=0}^{q} C_i SMC_{t-i} + \sum_{i=0}^{r} D_i ALG_{t-i} + \sum_{i=0}^{s} E_i GFC_{t-i} + \sum_{i=1}^{t} F_i VGOP_{t-i} + \sum_{i=0}^{u} G_i TO_{t-i} + u_t \qquad (6)$$

Subsequent ECM model was used to assess short run relationships between variables.

$$dHT_t = a_1 + b_1(ecm)_{t-1} + \sum_{i=1}^{p} B_i (dHT)_{t-i} + \sum_{i=0}^{q} C_i (dSMC)_{t-i} + \sum_{i=0}^{r} D_i (dALG)_{t-i} + \sum_{i=0}^{s} E_i (dGFC)_{t-i} + \sum_{i=1}^{t} F_i (dVGOP)_{t-i} + \sum_{i=0}^{u} G_i (dTO)_{t-i} + u_t \qquad (7)$$

Results and Explanations

The study has first employed ADF test to check the stationary properties in series because trended series with having unit root leads to spurious results. The results of ADF test are shown in table 1. The results show that only GFC is stationary at level while other variables are stationary at first difference. As the variables are stationary both at I (0) and I (1). So, current study employed ARDL approach to explore association between financial expansion and labor market instability.

Table: 1

Unit Root Test

ADF Test Statistics		
Variables	**Level**	**1st difference**
HT	-1.931	-3.495***
SMC	-2.385	-3.921**
ALG	-2.871	-5.932*
GFC	-4.104**	-3.949**
VGOP	-2.144	-3.896*
TO	-2.610	-5.458*

Note: *,**,*** shows 1%, 5% and 10% significance level respectively.

Table:2

ARDL(1,2,2,0,2,2) based on AIC

Dependent variable is HT			
Regressor	**Coefficients**	**Standard Error**	**T-Ratio [P-Value]**
SMC	5.213	1.771	2.948[.007]*
ALG	2.152	7.533	2.855[.009]*
GFC	0.001	0.411	2.644[.014]*
VGOP	1.854	8.311	2.231[.035]**
TO	2.165	1.488	0.548[.588]
INPT	-1.635	6.448	-2.525[.019]*

Note: *,** shows 1% and 5% significance level respectively.

To examine the relationship the study first checked the existence of co-integration under the bound test technique. The results show that F value (5.3671[0.000]) was more than upper critical bound and confirmed existence of long run linkage.

Table 2 shows results of ARDL model. Stock market capitalization (SMC) and asset and liabilities to GDP (ALG) show positive impact on labor market volatility. Coefficients of both measure of financial development at national and international level are also statistically significant at 1% level of significance. This shows that development in financial markets leads to increase dispersion of labor in income and employment. The results are reconciled with the research of Darcillon (2013) for OECD countries. The study has proved model of financial fragility (Keynes, 1936 and Minsky, 1986). Only trade openness is insignificant in explaining labor market instability. Volatility of output growth and gross fix capital has also shown positive effect.

Short run results are presented in table 3. Here value of ECM (-0.253) is also statistically significant and show that if there was disequilibrium in long run than due to any shock in short run almost 25% convergence will takes place in a year. The F statistics in table 3 shows overall significance of model and DW value confirmed no autocorrelation problem in the model.

Table

3 Error Correction Representations for Selected ARDL Model

Dependent variable dHT			
Regressor	**Coefficient**	**Standard Error**	**T-Ratio[Prob]**
dSMC	0.607	0.197	3.078[.005]*
dSMC1	-0.501	0.386	-2.097[.045]*
dALG	1.664	0.601	0.639[.527]
dALG1	-4.039	0.281	-1.771[.087]***
dGFC	0.275	5.997	4.596[.000]*
dVGOP	2.701	3.926	1.129[.268]
dVGOP1	-4.412	2.731	-2.128[.042]**
dTO	-5.625	3.566	-1.577[.126]
dTO1	-8.177	3.481	-2.348[.026]**
Inpt	-4.128	2.005	-2.058[.049]**
ecm(-1)	-0.253	0.094	-2.679[.012]*
R-Squared	0.782	R-Bar-Squared	0.655
Residual Sum of Squares	3.731	Equation Log-likelihood	-548.359
Akaike Info. Criterion	-563.359	Schwarz Bayesian Criterion	-575.836
DW-statistic	2.047	F(10, 28)	8.637[0.000]

The Table 4 shows F version and LM version values and it is shown that no any problem of serial correlation, functional form and hetroskedasticity. So, the diagnostic test also proved goodness of model.

Table 4

Results of Diagnostic Test

Test Statistics	LM Version	F Version
Serial Correlation	CHSQ (1) = 0.067[.795]	F (1, 23) = 0.039[.843]
Functional Form	CHSQ (1) = 0.067[.795]	F (1, 23) = 0.039[.843]
Normality	CHSQ (2) = 2.593[.273]	Not applicable
Heteroskedasticity	CHSQ (1) = 0.718[.396]	F (1, 37) = 0.694[.410]

Finally to check the stability in model the researcher has applied CUSUM and CUSUMSQ test. The test it performed at 5 % significance level. Results of this test in figure 1 shows that graph of these tests are inside the critical bound. So, it does not reject the null hypothesis of stability in model and it suggests stability of model at 5% level of significance.
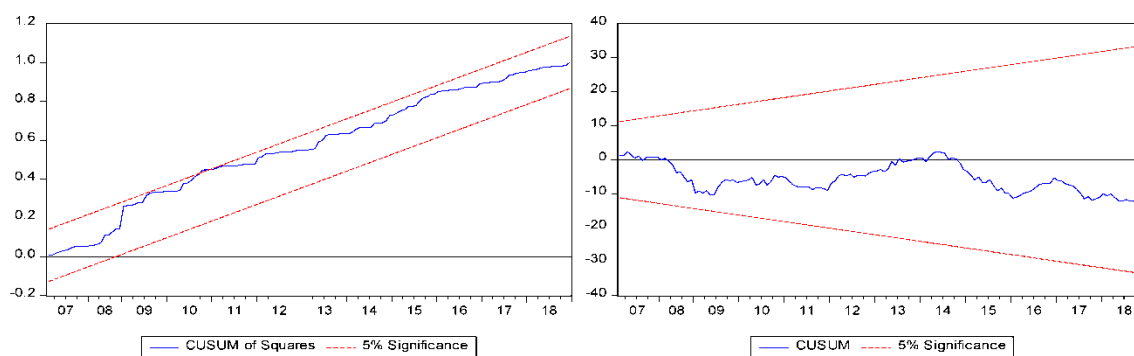

Figure 1

CUSUM and CUSUMSQ Test

Conclusion and Policy Recommendations

Present study is a step to the investigation of labor market volatility and its relationship with financial development. The study employed ARDL technique using annual data from 1973-2020. Volatility in labor market is modeled using rolling standard deviation of employment over a five year window. The study found significant positive relationship of financial development with labor market volatility. The results are reconciled with the study of Darcillon (2013) for OECD countries. The study has proved the theory of financial frailty (Aglietta and Rebérioux, 2005) which shows positive affiliation of financial markets with labor market uncertainty. Research suggested that development in the financial markets is necessary because it reflects the major economic position of a country and has significant impact on labor market. The research also suggested that highly coordinated wage bargaining systems have a dampening impact on inflation volatility.

References

Aglietta, M., & Rebérioux, A. (2005). *Corporate governance adrift. A critique of share-holder value*, Cheltenham, Edward Elgar

Buch, C. M. & Pierdzioch, C. (2013). *Labor market volatility, Skills, and financial globalization, Macroeconomic dynamics*, forthcoming.

Brutger, R., & Guisinger, A. (2022). Labor Market Volatility, Gender, and Trade Preferences. *Journal of Experimental Political Science, 9*(2), 189-202.

Dickey, D. A. & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica, 49*, 1057-72.

Darcillon, T. (2013). *What causes labor-market volatility? The role of finance and welfare state institutions.* CES Working Paper, No.89.

Doornik, B. F. N. V., Gomes, A. R., Schoenherr, D., & Skrastins, J. (2021). Financial Access and Labor Market Outcomes: evidence from credit lotteries. Available at SSRN 3800020.

Engle, R. F. & Granger, C. W. J. (1987), Cointegration and error correction: representation estimation and testing. *Econometrica, 55*, 251-276.

Fonseca, J., & Van Doornik, B. (2022). Financial development and labor market outcomes: Evidence from Brazil. *Journal of Financial Economics, 143*(1), 550-568.

Gatti, D & Vaubourg, A. G. (2005). *The financial determinants of unemployment: do they interact with labor market institutions*? Disscussion Paper Series.

Griffiths, W. E., Hill, C. R. & Judge, G.G. (2001). *Undergraduate econometrics, Second edition*, John Wiley and Sons, Inc.

Hussain, M., Zaman, B. & Ahmed, N. (2015). Relationship between stock market volatility and macroeconomic variables: Evidence from Pakistan. *Pakistan Business Review. 16*(4), 723-743.

Hussain, M., Awan, R. U., & Hassan, H. (2020). Eurozone Crisis and Asymmetric Volatility Spillover between the Stock Markets of Selected Emerging Asian and Developed Economies. *Global Social Sciences Review*, *1*, 399-409.

Jayadev, A. (2007). Capital account openness and the labour share of income. Cambridge *Journal of economics, 31*(3), 423-43.

Jerzmanowski, M & Malhar Nabar, M. (2008). *Financial development and wage inequality: Theory and evidence*. MPRA Paper No. 9841, posted 19.

Keynes, J.M. (1936). The General Theory of Employment Interest and Money. London: Macmillan. Reprinted in The collected writings of John Maynard Keynes, London: *Macmillan for the Royal Economic Society, 7*, 1973.

Kilic, M. & Wachter, J. A. (2014). Risk, unemployment, and the stock market: A rare-events-based explanation of labor market volatility. *Journal of Financial Economics.5*, 1-56.

Lei W, Li Z, Mei D (2023) Financial crisis, labor market frictions, and economic volatility. PLoS ONE 18(9): e0291106.

Onwioduokit, E. A., Adamgbe, E. T. & Buno1, E. N. (2007). Macroeconomic determinants of the labour market in Nigeria. Journal of Monetary and Economic Integration. *9*(2), 62-88.

Pesaran, H.M. & Shin, Y. (1999). Autoregressive distributed lag modeling approach to cointegration analysis. Econometrics and economic theory in the 20th. Century: The Ragnar Frischcentennial symposium. *Cambridge University Press, Cambridge*.

Pesaran, H.M. Shin, Y. & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*, 289-326.

Pagano, M., & Pica, G. (2012). Finance and employment. *Economic Policy. 27*(69), 5-55.

Rodrik, D. (1997). Has globalization gone too far? Washington, D.C., *Institute for International Economics.*

Rodrik, D. (1998). Why do more open economies have bigger governments? *Journal of Political Economy. 106*(5), 997-1032.

Shabbier, G., Anwar, S., Hussain, Z. & Imran, M. (2012). Contribution of financial sector development in reducing unemployment in Pakistan. *International Journal of Economics and Finance.*4(1), 260-268.

Zanetti, F. (2012). Financial shocks and labor market fluctuations. *University of Oxford.*1-41.