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THE IMPACT OF FINANCIAL DEVELOPMENT ON UNEMPLOYMENT: PANEL DATA ANALYSIS FOR BRICS-T COUNTRIES

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ABSTRACT

In this study, the impact of financial development on unemployment for BRICS-T countries (Brazil, Russia, India, China, South Africa and Turkey) between 1994 and 2021 is analysed using panel data analysis. The results of the analysis show that financial development has a statistically significant effect on unemployment rates. In particular, a 1% increase in financial development is found to increase the unemployment rate by 0.5213%. This finding indicates that financial development may have negative effects on the labour market, especially if it is directed towards capital-intensive sectors.

In this study, the effects of financial development on unemployment are comprehensively investigated using the panel data analysis method. The findings revealed the existence of an autocorrelation problem in the random effects model. The presence of inter-unit correlation is tested in detail with the Friedman test. According to the Driscoll-Kraay robust estimator results, the labour force variable is found to have a statistically significant effect. Moreover, employment rates analysed as a control variable also show a significant relationship. In general, it is concluded that financial development may reduce unemployment in the short run, but there is no significant relationship between these two variables in the long run. In the case of Turkey, the positive effects of financial development on unemployment are highlighted and it is emphasized that this situation should be questioned in depth with various economic and social factors. This study offers important implications for policymakers and helps them understand the implications of financial reforms on labour markets.

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FİNANSAL GELİŞMENİN İŞSİZLİK ÜZERİNE ETKİSİ: BRICS-T ÜLKELERİ İÇİN PANEL VERİ ANALİZİ

MAKALE BİLGİSİ
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ÖZ

Bu çalışmada, BRICS-T ülkeleri (Brezilya, Rusya, Hindistan, Çin, Güney Afrika ve Türkiye) için 1994-2021 yılları arasında finansal gelişmenin işsizlik üzerindeki etkisi panel veri analizi yöntemiyle incelenmiştir. Analiz sonuçları, finansal gelişmenin işsizlik oranları üzerinde istatistiksel olarak anlamlı bir etkiye sahip olduğunu göstermektedir. Özellikle, finansal gelişmede %1'lik bir artışın, işsizlik oranını %0.5213 oranında artırdığı bulunmuştur. Bu bulgu, finansal gelişmenin özellikle sermaye yoğun sektörlere yönelmesi durumunda işgücü piyasasında olumsuz etkiler yaratabileceğine işaret etmektedir.

Çalışmada, panel veri analizi yöntemi kullanılarak finansal gelişmenin işsizlik üzerindeki etkileri kapsamlı bir biçimde araştırılmıştır. Elde edilen bulgular, rastgele etkiler modelinde otokorelasyon probleminin varlığını ortaya koymuştur. Friedman testi ile birimler arası korelasyon varlığı detaylı bir şekilde test edilmiştir. Driscoll-Kraay dirençli tahminci sonuçlarına göre, işgücü değişkeninin istatistiksel olarak anlamlı bir etkiye sahip olduğu tespit edilmiştir. Ayrıca, kontrol değişkeni olarak analiz edilen istihdam oranları da önemli bir ilişki göstermektedir. Genel olarak, finansal gelişmenin kısa vadede işsizliği azaltabileceği, ancak uzun vadede bu iki değişken arasında anlamlı bir ilişki tespit edilmediği sonucuna ulaşılmıştır. Türkiye örneğinde ise, finansal gelişmenin işsizlik üzerindeki pozitif etkilerine dikkat çekilmiş ve bu durumun çeşitli ekonomik ve sosyal faktörlerle derinlemesine sorgulanması gerektiği vurgulanmıştır. Bu çalışma, politika yapıcılar için önemli çıkarımlar sunmakta ve finansal reformların işgücü piyasalarındaki yansımalarını anlamalarına yardımcı olmaktadır.

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1. INTRODUCTION

Financial development is widely recognised as a key driver of economic growth, primarily by enhancing the efficiency of resource allocation in modern economies. The evolution of financial systems can foster greater investment, expand production capacities, and reduce unemployment over the long term by improving access to finance for individuals, businesses, and the public sector (King and Levine, 1993; Beck, Demirgüç-Kunt, and Levine, 2007). However, the impact of financial development on labour markets often diverges from theoretical predictions due to variations in the structural characteristics of financial systems and the economic and institutional contexts of different countries.

In academic literature, the relationship between financial development and unemployment is typically examined through two primary theoretical lenses. The first perspective posits that financial development stimulates employment by accelerating economic growth (McKinnon, 1973; Shaw, 1973). As financial markets mature, savings are channelled into productive investments, entrepreneurship is encouraged, and new job opportunities are generated. Conversely, the second perspective highlights scenarios where financial development may exacerbate unemployment. For instance, if financial expansion disproportionately favours capital-intensive sectors, labour demand may decline (Levine, 2005). Additionally, financial shocks or crises can negatively impact employment and elevate unemployment rates.

The economic policies among the BRICS-T (Brazil, Russia, India, China, South Africa and Turkey) countries differ significantly due to their different economic structures, growth strategies and development priorities. While China and India stand out with their large domestic markets and export-based growth models, Russia follows an economic policy based on natural resource exports. Brazil has a strong position in agriculture and raw material exports and is taking steps to reduce income inequality with social policies. South Africa, while focusing on infrastructure investments and mineral exports, has made limited progress in developing its financial markets. Turkey, on the other hand, has been implementing policies to increase financial market depth and reduce external resource dependency in recent years, along with export-oriented growth strategies. However, Turkey’s problems such as high inflation, exchange rate fluctuations and macroeconomic instability cause it to differentiate itself from the BRICS countries. These differences also cause the effects on unemployment rates to vary from country to country.

The BRICS-T countries represent a group of emerging economies with significant growth potential and an increasingly influential role in the global economy. In recent years, these nations have implemented substantial reforms to strengthen their financial systems. Examples include Brazil's initiatives to enhance financial inclusion, India's adoption of digital payment systems, and Turkey's expansion of credit facilities. However, the diverse structures of labour markets and economic policies across BRICS-T countries complicate the analysis of the relationship between financial system growth and unemployment rates. These differences can significantly influence both the direction and magnitude of this relationship.

Understanding the link between financial development and unemployment is crucial from both theoretical and practical standpoints. Theoretically, it provides insights into the complex dynamics of economic systems, while practically, aiding policymakers in designing effective employment strategies. For example, rising unemployment due to financial deepening can lead to broader societal issues such as income inequality, poverty, and social instability. Therefore, an empirical investigation into how changes in the financial systems of BRICS-T countries affect unemployment can offer valuable insights for policymakers.

This study employs panel data analysis to explore the impact of financial development on unemployment in BRICS-T countries. The primary objective is to assess how the growth of financial systems influences unemployment rates. A distinctive aspect of this research is its focus on the relatively underexplored relationship between financial development and unemployment within the BRICS-T context. While existing literature has predominantly examined the effects of financial development on economic growth, its implications for labour markets have received less attention. This study aims to address this gap, and its findings are expected to contribute meaningfully to both academic discourse and policy formulation.

In the subsequent sections, the study will review relevant literature, present empirical evidence on the financial development-unemployment nexus, and analyze the dataset. The results aim to shed new light on the potential employment effects of financial system reforms, offering a fresh perspective for policymakers and researchers alike.

2. LITERATURE

The connection between financial development and employment dynamics has been a significant topic of interest in economic literature for decades. Numerous studies across various countries and periods have explored this relationship in depth. Merton (1992) highlighted that financial development fosters economic growth and positively influences employment by enhancing productivity. He argued that measures such as financial reforms and credit expansions amplify this effect. Similarly, Epstein and Heintz (2006) demonstrated that financial sector reforms in Ghana between 1986 and 2004 contributed to employment growth and poverty reduction. Bertrand et al. (2007) also observed that banking reforms in France in 1985 spurred rapid employment growth in sectors closely tied to banking.

In the United States, Benmelech et al. (2011) found that access to credit significantly impacts firms' employment decisions. Monacelli et al. (2012) noted that credit expansion in Italy boosts employment by strengthening firms' bargaining power in wage negotiations. Shabbir et al. (2012) revealed that financial sector indicators positively affect unemployment in both the short and long term in Pakistan. Boustanifar (2014) emphasized that the impact of bank loans on employment hinges on financial efficiency, with efficiency playing a pivotal role in driving employment growth. Chen, Kim, and Lin (2021) analyzed data from 97 countries between 1991 and 2015 using the system GMM method. Their study uncovered varying outcomes based on the type of financial development indicators and the flexibility of labour markets. Specifically, excessive financial development was found to increase unemployment in countries with rigid labour markets, while bank-based or market-oriented financial systems raised unemployment in flexible labour markets. Additionally, loans to the private sector were shown to exacerbate unemployment in rigid labour markets.

Turkey-specific studies also reveal diverse effects of financial development on employment. Kanberoğlu (2014), examining the period from 1985 to 2010, found that increases in the M_2 money supply raised unemployment, while loans to the private sector reduced it. The study also identified a positive correlation between the ratio of stock market values to GDP and the unemployment rate. Bayar (2016), in a panel data analysis of 16 developing countries from 2001 to 2014, found that financial development reduced unemployment in only four countries. The study also established a unidirectional causal relationship from financial development to unemployment. Karaçayır and Karaçayır (2016), using ARDL analysis for Turkey from 2006 to 2015, found that increases in domestic credit volume reduced unemployment in the short term but had no significant long-term impact. Ayhan (2019), analyzing data from 2005 to 2018 in Turkey, highlighted the unemployment-reducing effects of financial development.

3. ECONOMETRIC METHOD AND RESULTS

In this study, the effect of financial development on unemployment is investigated by considering the data for the years 1994-2021. This year range (1994-2021) was used to ensure data integrity between variables. Panel data analysis is performed for Brazil, Russia, India, China, South Africa and Turkey, which are called BRICS-T. The dependent and independent variables are logarithmized. Data were obtained from the World Bank and IMF. The data used in the analysis and their sources are given in Table 1 below.

Table 1: Definition of Variables

Variables	Short name of the variable	Description	Data Year Range and Source
Unemployment	LS	Logarithmic Unemployment Rate (%) (Share in Total Labor Force)	World Bank, 1994-2021
Financial Development	LF	Logarithmic Financial Development Index	IMF, 1994-2021
Employment	LST	Logarithmic Total Employment Rate (%) (Share in Total Labor Force)	World Bank, 1994-2021

The logarithmically transformed equation is shown in equation 1 below:

$$LS_{it} = \beta_0 + \beta_1 LF_{it} + \beta_2 \ LST_{it} + \upsilon_{it} \quad (1)$$

In the model used in the study, BRICS-T countries are considered. In this model, "i" indicates the unit dimension and "t" indicates the time dimension.

i=(1…6) ve (t= 1994…2021)

LS: Logarithm of Unemployment Rates
LF Logarithm of Financial Development Index
LST: The Logarithm of Employment Rates is included as a control variable.

In panel data models, whether the classical model is valid or not, in other words, whether there is a unit and/or time effect in the model can be revealed by analyzing through some tests. F Test and Breush Pagan LM Test are among these tests. In this study, LM and F tests were used to conduct the analysis. These tests determine whether the series differ by unit. If the series does not differ by units, the classical model is accepted to be valid. The main and alternative hypothesis of the F test is as follows (Yerdelen Tatoğlu, 2020: 213).

In order to determine whether the classical model, fixed effects model or random effects model is valid in panel regression analysis, the Bresuch- Pagan LM test can be used. The hypotheses of this test are as follows:
H_0: Unit and/or time effects are equal to zero.
H_1: Unit and/or time effects are different from zero.
In order to determine whether the classical model, fixed effects model or random effects model is valid in panel regression analysis, the Bresuch- Pagan LM test can be used. The hypotheses of this test are as follows:
H0: The variance of the unit and/or time effect is equal to zero.
H1: The variance of the unit and/or time effect is different from zero.
In other words, the null hypothesis H0 can also be expressed as "there is no unit and/or time effect". As a result of the rejection of the null hypothesis H0, it is decided that there are unit and/or time effects in the model. If it is decided that there are unit and/or time effects in the

model as a result of LM and F tests, it should be determined whether these effects are fixed effects or random effects. If fixed effects or random effects are consistent in the model, the Hausman Test is the analysis that shows which is more efficient in terms of efficiency. Hypotheses of the Hausman test;
H0: There is no correlation between explanatory variables and the error term.
H1: The explanatory variables and the error term are correlated (Yerdelen Tatoğlu, 2020: 196). The results regarding whether the classical model, fixed effects model or random effects model is appropriate for the model of the effect of financial development on unemployment are given in Table 2.

Table 2: Panel Data Regression Analysis Estimator Tests

	Statistic Values	Probability (Prob) Values
F Test	466.71*	0.000
LM Test	1715.69*	0.000
Hausman Test	0.53*	0.7669

*Note: Indicates 5% significance level.

Table 2 presents the F, LM. and Hausman test results. According to the F test results shown in Table 2, since the probability (prob) value is less than 0.05, i.e. p=0.000<0.005, the null hypothesis H_0 is rejected and the existence of unit and/or time effect is accepted. In other words, it is concluded that the existence of unit and/or time effect is significant in the model of the effect of financial development on unemployment at 5% significance level. In short, as a result of this analysis, it can be stated that the classical model, the Pooled ECT model, is not valid for this model.

When the results of the Bresuch -Pagan LM (1980) test analysis are analyzed in the model in which the effect of financial development on unemployment is examined, the basic hypothesis H_0 is rejected since the Prob(probability) value is less than 0.05, i.e. p=0.000<0.05. In this case, it is seen that the presence of unit and/or time effect is significant at 5% significance level. Thus, according to the result of the LM test analysis, it can be stated that the classical model is not valid.

According to the results of the F test and Breusch-Pagan LM test, it is concluded that the pooled ECT method is not valid in the model. Hausman test is conducted to decide whether the effect is fixed effect or random effect since unit and/or time effect is found as a result of F, LM test. As explained in Table 4, the probability value is greater than 5% significance level (p=0.76>0.05). According to this result, the null hypothesis is not rejected. It is decided that the appropriate analysis method for the model of the Impact of Financial Development on Unemployment is the random effects model.

As a result of the tests conducted for the model of the effect of financial development on unemployment, it was decided that the appropriate analysis is the random effects regression analysis. In this direction, assumption tests should be performed to test whether there are heteroskedasticity, autocorrelation and inter-unit correlation problems. Levene (1960), Brown and Forstyhe (1974) analyses were performed to test the presence of heteroskedasticity in the random effects model. The results of these analyses are presented in Table 3.

Table 3: Heteroskedasticity Test Results

	X^2	Prob. Value
W0	11.6496*	0.000
W50	6.1508*	0.000
W10	10.2142*	0.000

* Note: Indicates 5% significance level.

Table 3 presents the heteroskedasticity test results in the random effects model. According to the heteroskedasticity result, since the probability values are less than 0.05 (p=0.000< 0.05), hypothesis H0 "no heteroskedasticity" is rejected. Accordingly, it is concluded that there is a heteroskedasticity problem across units.

In order to determine whether there is an autocorrelation problem in the efficiency of the random effects model, the Durbin Watson Test and Baltagi-Wu (1999) Best Invariant LBI Test were used. Table 4 presents the Autocorrelation Test results.

Table 4. Autocorrelation Test Results

ModifiedBhargavavd.Durbin Watson	0.3763
Baltagi –Wu LBI	0.5078

Table 4 shows the Autocorrelation test results in the random effects model. It is concluded that the critical values obtained in both tests in Table 4 are below 2. and the null hypothesis H_0 "There is no autocorrelation" is rejected. Therefore, it is concluded that there is an autocorrelation problem in the random effects model. Friedman test is used to test for the presence of correlation between units. Table 5 presents the results of inter-unit correlation for the random effects model.

Table 5 Inter-unit Correlation Test Results

	x^2	Prob. Değeri
Friedman Testi	33.507*	0.0000

* Note: Indicates 5% significance level.

According to the results in Table 5, it is seen that p=0.000< 0.05 at 0.05 significance level for both tests and it is concluded that the main hypothesis H_0 "there is no correlation between units" is rejected. Therefore, the Friedman Test shows that there is an inter-unit correlation in the random effects model.

It is concluded that there are heteroskedasticity, inter-unit correlation and autocorrelation problems in our model in which we investigated the effect of financial development on unemployment. In this case, it can be stated that the estimators will lose their consistency and efficiency. It is appropriate to estimate the effect of financial development on unemployment with the Driscoll-Kraay robust estimator. The results of the Diriscoll-Kraay estimator are given in Table 6.

Tablo 6. Driscoll- Kraay Dirençli Tahminci Sonuçları

	Coefficient	Driscoll-Kraay St	t	P>|t|
LF	0.5166	0.1022	5.05	0.000
LST	-0.4987	0.1753	-2.84	0.008
Fixed	1.8572	0.1927	9.64	0.000
Prob(Probability)	0,000			

* Note: Indicates 5% significance level.

According to the results of the Driscoll- Kraay robust estimator in Table 6, the LF variable is statistically significant for the Impact of Financial Development on Unemployment model obtained using the data between 1994-2021 for BRICS-T countries. In addition,

employment rates included in the model as a control variable are also statistically significant (P>|t| value 0.000).

The findings obtained from the Driscoll-Kraay robust estimator results show that a 1% increase in financial development leads to a 0.5166% increase in unemployment rates. As a result of the robust estimator, the effect of financial development on unemployment is statistically significant at the 5% significance level. In other words, it is concluded that a 1% increase in financial development increases unemployment by 0.5166%. The findings are consistent with the studies of Gatti et al. (2009), Han (2009) and Castillo (2009) in the literature.

CONCLUSION

Financial systems play a critical role in the functioning of modern economies. Financial development can accelerate economic growth and increase access to finance for individuals and businesses. However, this process can have complex effects on labour markets. In this study, the impact of financial development on unemployment in BRICS-T (Brazil, Russia, India, China, South Africa and Turkey) countries is analysed by panel data analysis using data for the period 1994-2021. The results of the analysis show that financial development has an increasing effect on unemployment rates. The finding that a 1% increase in financial development increases unemployment by 0.5213% indicates that employment may be negatively affected especially when financial resources are directed towards capital-intensive sectors.

This finding is supported by some studies in the literature. For instance, Gatti et al. (2009) argue that market-based financial systems may increase unemployment when they are not compatible with labour market regulations. Similarly, Han (2009) argues that distortions in the financial system may have negative effects on employment, which may even negatively affect the affordability of basic needs. Moreover, Castillo (2009) emphasizes that during periods of global financial crisis, employment losses in small and medium-sized enterprises increase and that youth, women and immigrants are the groups most affected by this process.

On the other hand, the findings support the view that financial development contributes to economic growth by increasing productivity, but the impact of this growth on the labour market may not always be positive. For instance, Merton (1992) emphasizes that financial development increases productivity, while Monacelli et al. (2012) argue that credit expansion provides firms with stronger wage bargaining opportunities and that the effects on employment largely depend on firms' strategies. Turkey-specific studies have also addressed different aspects of the effects of financial development on unemployment. Tuğcu and Aslan (2012) emphasize the positive effects of financial development on employment in Turkey, while Ayhan (2019) analyzes the macroeconomic determinants of unemployment and concludes that increases in the level of financial development can reduce unemployment rates. However, in this study, the finding that financial development increases unemployment rates across BRICS-T countries emphasizes the impact of sectoral differences and institutional structures in Turkey and other countries.

The pandemic experienced during the years covered by the study had significant effects on both the economic structures and unemployment rates of BRICS-T countries. In particular, the economic recession caused by the pandemic caused sudden and serious disruptions in labor markets and tested the resilience of the economic policies and financial systems implemented by the countries. The impact of COVID-19 has made the differences between countries more apparent. For example, countries with large domestic markets such as China and India were able to overcome the economic effects of the pandemic with faster recovery processes. In contrast, Russia and Brazil, which are dependent on natural resource exports, were seriously

affected by the contraction in global trade. Turkey, on the other hand, faced a different economic challenge than other BRICS countries during the pandemic, with both the loss of tourism revenues and increased unemployment rates.

In conclusion, the direction and magnitude of the relationship between financial development and unemployment are shaped by the economic structures of countries, the efficiency of financial systems and labour market dynamics. Therefore, supporting labour-intensive sectors, reducing income inequalities and implementing social policies to minimize the risk of unemployment are of critical importance in the processes of deepening financial systems. This study makes a unique contribution to the literature by analyzing the relationship between financial development and unemployment in BRICS-T countries in detail. Future research may focus on analyzing sectoral effects and examining the effects of financial development on other social and economic indicators.

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