JOURNAL OF RESEARCH IN ECONOMICS

Contents

RESEARCH ARTICLE

INTERGENERATIONAL MOBILITY IN TURKEY BASED ON EDUCATION

Y. Enes AKSU[*] ID

Feride DOĞANER GÖNEL[**] ID

Abstract

The concept of intergenerational mobility refers to the association between parents' and their children's socio-economic well-being. As an interest and policy area, understanding the three aspects of intergenerational transmission stands out, i) social welfare ii) equality of opportunity, and iii) economic efficiency. First, it is essential to know how resources are allocated across generations because this allocation process may influence overall social welfare defined over the entire income distribution of different generations. Secondly, intergenerational mobility may be seen as a measure of equality of opportunity. Moreover, it can be one of the ways to reduce socioeconomic inequality by promoting social justice and achieving a more equitable allocation of resources (D'Addio, 2007). Although the studies of intergenerational transmission go back to the mid-19th century (Galton, 1869), it has been started to analyze and interpreted, more recently. From the 1960s, some empirical studies on economic, social and political determinants of mobility mostly in developed countries, such as the UK, USA, Canada and Sweden (Solon, 1999, 2002; Zimmerman, 1992; Black and Devereux, 2010; Björklund and Salvanes, 2011), are published, but for developing countries there are few works mostly due to data constraints and structural problems such as informal and household-based economic activities (Mercan, 2012, 2020; Emran & Shilpi, 2019, Demirtaş and Torul, 2023). In this direction, this study aims to contribute scarce literature on intergenerational mobility in Turkey by using the Adult Education Survey (AES) provided by TURKSTAT. Our results indicate a strong relationship between the socioeconomic status of the family and the socioeconomic status of the child, albeit decreasing over the birth cohorts. In addition to these results, persistence in terms of intergenerational mobility is higher for females with respect to males.

Keywords: Intergenerational Mobility, Education, Human Capital

JEL Classification: J6, I2

1. Introduction

It has long been recognized that high levels of intergenerational mobility in a society have important social and economic consequences. Most importantly, low relative intergenerational mobility is likely to create a sense of fairness arising from the fact that an individual's welfare is

---

[*]   Piri Reis University, Economics and Finance Department, E-mail: yeaksu@pirireis.edu.tr, ORCID: 0000-0001-5114-9620

[**]   Yildiz Technical University, Economics Department, E-mail: gonel@yildiz.edu.tr, ORCID: 0000-0001-7946-9298

1

almost entirely dependent on birth. Another point is that relatively low intergenerational mobility will hinder potential productivity gains that would exist in the economy and directly affect the welfare of society. When children's skills are neglected due to insufficient resources, society also loses out. Galton issued the first warning in this regard (1869). The relationship we call the regression line was shaped by Galton for the first time in the 19th century, with the idea that parental traits are passed on to their children. He compared children's height to their parents and found that adult children are closer to average height than their parents. We can easily relate the Galtonian approach to the extent to which generations inherit their present status from the past and to what extent they will transfer it to the future. Therefore, the concept of intergenerational mobility refers to the association between parents and their children's socioeconomic well-being. Once we acknowledge the significance of the issue, we also understand that the degree of intergenerational mobility is one of the fundamentals for the understanding of inequality in both economic and social means; in the case of low intergenerational mobility, poverty during childhood will not only undermine the health, nutrition and education prospects of children but will also increase the possibilities that the children of the next generation will grow up in low-income households (D'Addio, 2007).

In this context, understanding the three aspects of intergenerational transmission stands out as an area of interest and policy: i) social welfare ii) equality of opportunity, and iii) economic efficiency. First, it is essential to know how resources are allocated across generations because this allocation process may influence overall social welfare defined over the entire income distribution of different generations. Secondly, intergenerational mobility may be seen as a measure of equality of opportunity. Moreover, as mentioned above, it can be one of the ways to reduce socioeconomic inequality by promoting social justice and achieving a more equitable allocation of resources. For example, the likelihood of achieving social cohesion can be higher in a society where people believe that they can move up the social ladder thanks to their abilities, talents, and efforts rather than opportunities linked to their socio-economic background. Third, intergenerational mobility may also be an instrument for achieving greater economic efficiency because high mobility may imply talents of some individuals placed at the bottom of the income distribution are not wasted (D'Addio, 2007).

The literature on intergenerational mobility and its measurement is based on three "factors," namely income, occupation, and education, and addresses different aspects of social class structure with respect to the social status of the individual. As an interdisciplinary area, a large number of studies can be found in sociology literature, which tries to capture the intergenerational transmission of occupations (Erikson, Goldthorpe, & Portocarero, 1979; Torche, 2005; Goldthorpe, 2014). In addition, the sociological literature also distinguishes between absolute and relative mobility. Absolute mobility focuses on the number of individuals moving from one social class to another (D'Addio, 2007). On the other hand, relative social mobility, also known as social fluidity, is concerned with the probability of individuals from different backgrounds moving into a particular social class. It includes the proportion of individuals from two different categories who go through a given mobility transition. On the other hand, the literature on economics focuses

on the intergenerational transmission of earnings (or income) (Solon, 1992; Zimmerman, 1992; Black & Devereux, 2010). However, a growing body of research in both economics and sociology also concentrates on education due to its mediating role in an individual's prospects by using human capital theory. Vast empirical literature points out that the education level of an individual is strongly connected with his/her future earnings (Becker, 1975; Mincer, 1974; Card, 1999, 2012). Therefore, access to education and educational inequality in a country play an important role in the eventual social class structure and future income inequality. This relationship between economic inequalities and education inequalities represents a societal failure.

In this framework, this study aims to contribute scarce literature on intergenerational mobility in Turkey by using the Adult Education Survey (AES) provided by TURKSTAT. The rest of the paper is organized as follows. After this introduction section, section 2 explains intergenerational mobility and provides a literature review from the perspective of economics and sociology disciplines. Section 3 describes the data and discusses the methodology. Section 4 presents the estimation results of intergenerational mobility in Turkey. Section 5 offers conclusions and discusses our results by using the previous studies on intergenerational mobility in Turkey.

2. Overview of Literature on Intergenerational Mobility

The connection between education and social background in the literature of intergenerational mobility research is highly robust. While educational attainment plays a significant role in determining socioeconomic success, parental education also exerts a primary influence on a person's educational outcomes. Educational outcomes are more easily measured than other socioeconomic outcomes and closely related to the mechanisms underlying the intergenerational transmission of socioeconomic status. In particular, educational outcomes are considered to be important mediators for income and occupational success.

The mediating role of education in intergenerational mobility role has been formalized by Solon (2004). According to Solon, in generation t, labor market earnings W are a function of human capital H,

$$W_t = \gamma_1 H_1 + v_t \tag{1}$$

where u_t stands for a random error term and γ_1 represent returns to the human capital investment of an individual in generation t. If a descendant's human capital accumulation process is related to the earnings of parents. Then the human capital level of the descendant can be written as,

$$H_t = \delta_1 W_{t-1} + \epsilon_t \tag{2}$$

3

where ϵ_t is a random error term and δ_1 shows the sensitivity of the descendant's human capital level to parental earnings. Thus, combining equation (1) with (2) yields an intergenerational mobility function which is,

$$W_t = \gamma_1 \delta_1 W_{t-1} + u_t \qquad (3)$$

where $u_t = \gamma_1 \epsilon_t + v_t$. Thus, intergenerational mobility will be higher where the returns of human capital γ_1 are lower and/or sensitivity of human capital accumulation to parental earnings lower. In this respect, in a country where there is a market-oriented educational system, it is expected that educational attainment will be strongly related to the income level of the family (because of credit constraints), and access to education will be difficult for the kids of households that placed at the bottom of the income distribution. Hence, the elimination of credit constraints and increasing public provision in education is expected to decrease educational inequality.

In economics, educational attainment is often expressed in terms of the number of years of schooling required to achieve a particular degree. The relationship between parent and child years of schooling can then be analyzed using a single regression or correlation coefficient. In other disciplines, educational outcomes are more commonly ranked, for example, by ranking degrees. The choice of approach relies on several factors, such as the focus of the study and whether the relationship between parent and child years of schooling can be accurately described using a linear function.

One significant limitation in the interpretation of educational outcomes is that they can be coded in separate ways, which can create challenges when attempting to compare them. For example, the meaning of "twice as much" education is not as clear or objective as it is for income. Educational degrees may not be comparable across countries or over time, and this issue is not resolved when educational degrees are converted into years of schooling. In addition to this issue, education is generally easier to measure than income and is more frequently reported in intergenerational data. Most people complete their education in their twenties, which enables it to be accurately captured through a single measurement early in life, regardless of their current employment status.

Therefore, even in countries where income data is available, educational outcomes are often used in settings. For example, combining educational and income information can provide a more current assessment of socio-economic mobility for young generations (Chetty et al., 2014). Educational statistics are also used to extend the scope of cross-country comparisons (Hertz et al. 2007). One limitation of historical or trend analysis is that there may be limited variation in educational outcomes in earlier generations, in which only a small proportion of the population may have received more than basic schooling. This can affect the comparability and precision of estimates.

In this context, the first studies on intergenerational educational mobility reveal the fact that there is a strong association between parental education level and a child's educational attainment (Dearden et al., 1997; Checchi et al., 1999, 2008; Behrman & Rosenzweig, 2002; Black et al., 2005; Björklund & Salvanes, 2011). On the other hand, recent studies on intergenerational educational mobility concentrate on explaining how much of the high association between education levels of parent and child is attributable to the genetic transmission of ability (nature) and environmental factors provided by parents such as non-cognitive abilities, income, social networks, and neighborhood (nurture).

To identify this causal relationship, three different strategies stand out in the literature. The first one is using samples of twins to capture children's abilities (Behrman & Rosenzweig, 2002, Holmlund et al., 2008, Bingley et al., 2009), secondly using the samples of families with adopted children to differentiate of parent's ability (Plug, 2004, Björklund et al., 2006, Haegeland et al., 2010), thirdly using various reforms of the education system as a source of exogenous variation in parental education (Chevalier, 2004, Oreopoulos et al., 2006, Maurin & McNally, 2008). According to the results of these studies, at most half of the educational outcome correlations between parents and descendants can be considered as causal effects, more specifically, common family factors. From the nature vs. nurture perspective, it is difficult to find support for the view that one is particularly more important than the other and the common result from both strategies is that both nature and nurture are effective in children's educational outcomes (Björklund & Salvanes , 2011).

From another perspective, starting with Hertz et al. (2007), another branch of the literature aims to analyze and understand the variation of intergenerational educational mobility across countries (Chevalier et al., 2009; Narayan et al., 2018; Emran & Shilpi, 2019; Leone, 2019; van der Weide et al, 2021). According to Hertz et al. (2007), on average, Scandinavian countries have the highest level of intergenerational mobility, and Latin American countries are the least. Studies by Narayan et al. (2018) and Leone (2019) verify this finding and underline two significant mechanisms contributing to variation among countries. First, in rich countries, success in educational attainment is higher than in poor countries. Second, in poor countries, once an individual reaches the tertiary educational level the transmission of privileges is higher than in rich countries.

On the other hand, using education as a measure of intergenerational mobility has a critical weakness in both within a country and between country comparisons, due to the different educational qualities (Leone, 2019). Moreover, there has been increasing interest in the field of study and institutional quality of educational careers, especially in terms of how these factors can impact lifetime earnings. Kim et al. (2015) have shown that the earnings gap between college graduates with different majors in the United States can be larger than that between high school graduates and college graduates. Additionally, there are significant differences in the quality of institutions within each field, leading researchers to study the impact of attending elite or prestigious institutions versus less prestigious ones on social mobility and outcomes (Attanas io & Kaufmann 2009; Torche, 2011; Chetty et al. 2017; Monsen, 2018; Thompson, 2019). Accordingly,

two important results stand out in Chetty's (2017) study. First, the likelihood of attending the most prestigious universities varies significantly by family income, with children whose parents are in the top 1% of the income distribution being 77 times more likely to attend an Ivy League university than children whose parents are in the bottom 1% of the income distribution. However, top-tail mobility rates (from the bottom 1% to the top 1%) are highest at elite universities such as Ivy League universities.

In this respect, intergenerational educational mobility literature in Turkey has recently started with Tansel (2015). Using the Adult Education Survey conducted by TURKSTAT in 2007, the study states that the intergenerational education correlation coefficient between the years of education completed by the descendants and the fathers did not decrease significantly over time. Moreover, according to the results, the probability of the descendants having a university degree was positively and significantly related to the educational level of the fathers' educational level, and the daughters face worse educational expectations than sons in achieving both high school and college degrees. Like Tansel (2015), Bakış (2017), using European Social Survey data, calculates intergenerational educational mobility in Turkey and compares his results with European Union countries. According to his results, intergenerational educational mobility in Turkey proves to be relatively low, yet this gap between Turkey and EU countries closes for younger generations. Akarçay-Gürbüz and Polat (2017) is another study that deals with intergenerational mobility models in Turkey. By employing census data from 1990 and 2000, they perform two-stage IV-probit and two-stage residual inclusion regressions (2SRIs) to address the possible problem of neglected variable bias that could affect the estimated marginal impact of parental education on a child's education. Comparing the results obtained with an intergenerational probit regression with those obtained by IV-probit means that the marginal effect of paternal education on a child's educational outcome is exaggerated in the usual probit regression due to neglected variable bias. When the authors define educational attainment as a categorical variable and rely on the 2SRI methodology, they find that the usual probit regression underestimates the marginal effect of maternal education and exaggerates the effect of paternal education.

Aydemir and Yazıcı (2019) by using microdata from their own field research, estimate the intergenerational education correlation and regression coefficients for various subregions of Turkey and examine how regional development and regional educational inequality affect intergenerational educational persistence between parent and child. Aydemir and Yazıcı (2019) argue that when compared to developed countries, the degree of intergenerational education mobility is relatively low in Turkey and the size of the relationship between parents and child's education is inversely related to the regional development level. The authors also find a negative and significant relationship between the degree of intergenerational mobility and the educational inequality of parents across regions. Öztunalı and Torul (2019), in addition to the evolution of intergenerational educational persistence across generations, analyze the relationship between within-cohort educational inequality and intergenerational educational mobility, by using the wave 2011 of Survey of Income and Living Conditions dataset of TURKSTAT. Their findings indicate that intergenerational educational persistence decreases, and educational inequality

decreases over younger birth cohorts, which implies it is accurate to show a time series analog of the Great Gatsby Curve relationship between inequality and mobility.

3. Data and Methodology

3.1. Data

In this study, we use micro-data from the Adult Education Survey (AES)'s 2007, 2012, and 2016 waves provided by the TURKSTAT. The Adult Education Survey (AES) covers adults' participation in education and training. AES provides rich information on respondents' participation in formal education, non-formal education, and training, informal learning, the volume of instruction hours, characteristics of the learning activities, reasons for participating, obstacles to participation, access to information on learning possibilities and guidance, employer financing and costs of learning, self-reported language skills. Besides, it provides information about the educational outcomes of respondents' parents through a questionnaire conducted in a retrospective fashion. Thus, it allows the estimation of intergenerational transmission without co-residency bias. The first wave of AES includes information on individuals who were born between 1943 and 1982 (Ages 25-64), but the second and third waves include the 18-25 age group and individuals above age 65. In this work, we exclude the 18-24 age group from the 2012 and 2016 waves. Thus, this age group can be considered the one in which the education phase has been completed.

Locations with a population over 20,000 are defined as urban and locations with a population of 20,000 or less are defined as rural locations in the survey as defined by State Planning Organization in 1982. However, due to legal modification that took place in March 2014, 30 provinces in Turkey have become metropolitan municipalities and rural areas of these provinces become neighborhoods within urban areas by definition. Consequently, the rural population in these cities has decreased by 21% to 3%. To ensure representativeness, TURKSTAT no longer provides information about rural-urban breakdown as of the 2016 wave. Therefore, the data set published in 2016 is not used in the context of intergenerational mobility across the urban-rural divide in the following section of the study. As a result, the total number of observations for three waves of AES is 71,705 and for first two waves of AES is 55,348.

Although the education level of respondents was given with ISCED (International Standard Classification of Education) classification, the educational level of parents provided as a categorical variable in AES which was described as i) low education level (at most lower secondary), ii) intermediate education level (upper secondary) and iii) high education level (tertiary). As a result of this discordance, we are obliged to redefine the education variable of a child in accordance with parental education. Hence, for the ISCED categories of 1 – primary school, 2 – general lower secondary, vocational or technical lower secondary, primary education with addition of no formal education defined as "at most lower secondary". For the ISCED category of 3 – general upper secondary, vocational or technical upper secondary defined as "upper secondary". Finally,

for the ISCED categories of 5 – associate degree (2 or 3 years), 6 – bwachelor's programmes, 7 – master's programmes, 8 – doctorate defined as "tertiary".

Table 1. Share of Educational Levels of Child and Parents

Education (Obs. = 71,705)							
Birth Cohorts	**Share in Sample**	**At Most Lower Secondary**		**Upper Secondary**		**Tertiary**	
		Child	Parent	Child	Parent	Child	Parent
1943-1947	2.65	87.89	97.05	5.69	1.69	6.42	1.26
1948-1952	6.93	85.02	95.71	7.37	2.50	7.61	1.79
1953-1957	10.41	81.26	95.55	9.77	2.88	8.97	1.57
1958-1962	11.92	77.31	95.06	13.77	3.00	8.92	1.94
1963-1967	13.31	76.73	94.81	13.70	3.27	9.56	1.92
1968-1972	13.81	74.26	92.93	14.01	4.21	11.73	2.86
1973-1977	14.98	66.33	89.84	19.06	5.86	14.6	4.29
1978-1982	15.94	58.07	85.84	23.33	8.40	18.60	5.77
1982-1987	7.73	51.45	81.03	22.92	11.93	25.63	7.04
1988-1991	2.33	41.78	77.94	25.52	13.51	32.7	8.55

Table 1 delineates educational trends across distinct birth cohorts spanning from 1943 to 1991. Notably, there is a discernible progression in educational attainment over time. For instance, in the earliest cohort (1943-1947), 97.05% of parents had education up to lower secondary levels, but this figure diminishes in subsequent generations. Conversely, the percentage of parents with tertiary education increases steadily from 1.26% in the earliest cohort to 8.55% in the latest (1988-1991). Intergenerational shifts are evident, with educational levels for children surpassing those of their parents in later cohorts. This data suggests a positive trend in educational advancements across generations, indicative of societal progress and evolving educational opportunities.

3.2. Methodology

First, we start our educational mobility analysis with Markov Transition Matrices. There are three summary mobility indicators commonly used in literature. The first one is Prais/Shorrocks mobility index, and it captures the average probability across all educational outcomes that an individual will leave his/her initial class in the next period and defined as,

$$M_1 = \frac{m - tr(P)}{m - 1} \tag{4}$$

where m is number of educational outcomes and $tr(P)$ is the trace of transition matrix P

Second summary index is, Bartholomew index and gives the average number of educational classes crossed by all individuals and characterized as,

$$M_2 = \frac{m}{m-1}\left(\sum_i^m \sum_{j=1}^m p_{ij}|i-j|\right) \tag{5}$$

where p_{ij} is the probability of the child who educational background i moves to educational outcome j and $|i-j|$ is the distance between educational outcomes i and j.

Thirdly, Eigenvalue index measures the speed at which a child escapes their parent's educational level status (Richey & Rosburg, 2015).

$$M_3 = 1 - |\lambda_2| \tag{6}$$

where λ_2 is the second largest eigenvalue of transition matrix P. For all these summary mobility measures value of 1 implies perfect mobility and the value of 0 implies perfect immobility (Formby et al., 2004).

In the second part of the empirical analysis, similar to Öztunalı and Torul (2019), we employed ordered logit regressions to estimate the conditional educational intergenerational transition probabilities and persistence for each birth cohort. The econometric specification with the OLS methodology of previous intergenerational educational mobility literature (such as Tansel, 2015, Aydemir & Yazıcı, 2019), adapted directly from the income mobility literature, is based on strong modeling assumptions such as linearity, symmetry, cardinality, and monotony in the relationship between the years of education of children and their parents, moreover, it necessitates information provided as years of schooling continuously. These constraints implicitly assume that a year in higher education, a freshman year, or a year of non-graduation has the same marginal effects as other years of education, contrasting the well-known sheepskin effect in education (Öztunalı & Torul, 2019). Since AES provided education information as a categorical variable, using the conventional methodology of the income mobility literature is infeasible for this study.

In this sense, the general form of our model for intergenerational educational mobility is characterized as;

$$C_{it} = \alpha_1 P_{it} + \alpha_2 G_{it} + \alpha_3 U_{it} + \sum_{z=b.cohort}^{b.cohort} \alpha_z Y_{zit} + +\epsilon_{it} \tag{7}$$

where C_{it} is the educational attainment level of child i born in year t, P_{it} stand for educational attainment level of parent which defined as most educated parents' attainment level achieved by parents. For examining of gender differences, we also add dummy variable G_{it}, which takes value of 0 for daughters and 1 for sons. In addition, we also try to explore urban-rural variation by adding U_{it}, which takes the value 1 if the respondent living in an urban area and 0 for rural area.

As a last regressor set, we also control for cohort fixed effects via dummy variables Y_{zit} which takes the value 1 if the individual i is born in year z, and 0 otherwise.

After the estimation of regression coefficients and odds ratios, we construct intergenerational persistence variable as follows,

$$Persistence_t = \frac{\sum_{j=1}^{3} Pr_t(C = j | P = j) x N_t(P = j)}{\sum_{j=1}^{3} N_t(P = j)} \qquad (8)$$

where $Pr(C = j)$ and $Pr(P = j)$ is probability of child and his/her parents' educational outcome J and $N_t(P = j)$ is the number of children in birth cohort t whose educational outcome of parent equal to J.

4. Results of Analysis

This section reports empirical results with the methodology defined in light of the above explanation. Firstly, we start with mobility measures which are calculated from Markov transitional mobility matrices. Next, we explore the evolution of the intergenerational educational persistence between parents and their offspring among cohorts. Finally, we will present and discuss the differences in intergenerational persistence over birth cohorts in gender and urbanization breakdown for both dimensions.

4.1. Transition Matrices

Prais/Shorrocks (M_1), Bartholomew (M_2), and Eigenvalue (M_3) mobility index results based on Markov Transition Matrix (P) presented in Table 2. According to the results, M_1 calculated as 0.59, these findings indicate lower mobility estimation with respect to Bakış's (2017) estimation of 0.8 based on the European Social Survey dataset.

Table 2. Intergenerational Educational Mobility Based on Markov Transition Matrix Indices

| Type of Indices | General | Gender | | Birth Cohorts | | | | |
		Sons	Daughters	1943-1952	1953-1962	1963-1972	1973-1982	1983-1991
M_1 – Prais/Shorrocks	0.595	0.623	0.572	0.580	0.597	0.588	0.624	0.661
M_2 – Bartholomew	0.226	0.239	0.215	0.222	0.228	0.224	0.237	0.261
M_3 – Eigenvalue	0.331	0.381	0.291	0.278	0.322	0.324	0.379	0.456

However, in line with previous empirical studies, intergenerational educational mobility is increasing across younger birth cohorts, Prais/Shorrocks index calculated as 0.58 for the oldest birth cohorts' group with respect to 0.66 for 25-34 age group. This result verified with

the Bartholomew index, the average jump in educational outcomes is higher for younger generations. It is calculated as 0.26 for the youngest birth cohort against 0.22 for the individuals born between 1943-1952. Additionally, the Eigenvalue index, which captures the speed of escape from the parental educatiownal background is higher for the 1983-1991 birth cohorts relative to the 1943-1952 birth cohort. It is calculated as 0.46 for the youngest birth cohort versus 0.28 for the oldest.

Another similar result to previous studies (Bakış, 2017; Tansel, 2015; Öztunalı & Torul, 2020), there is a gender differential in intergenerational educational mobility. Male descendants have higher educational prospects with respect to females. It is calculated as 0.62 for sons corresponding to 0.57 for daughters. The Bartholomew index results are 0.24 for sons with respect to 0.21 for daughters. As a last measure, the Eigenvalue index was calculated as 0.38 for sons relative to 0.29 for daughters.

4.2. Intergenerational Educational Mobility Dynamics

Odds ratios calculated from generalized ordered logit regression results are presented in Table 3. Based on the findings of the parental educational level of a child affects educational attainment positively, as expected. More openly, for an individual wo has a high parental educational background, the odds of higher educational attainment are approximately 5.39 times greater than with respect to low and intermediate educational attainment. This result is more excessive for the probability of high and intermediate educational attainment level. The odds are 8.02 times greater with respect to probability of low educational attainment.

Figure 1 panel (a) shows the intergenerational educational persistence across birth cohorts, which can be interpreted as the measure of intergenerational immobility. It captures the probability of a randomly selected child from a particular birth cohort having the same educational outcome as his/her parent, which is calculated from equation (5). According to findings, persistence decreases over the younger generations. Specifically, it decreased to 53% for the cohort born in 1991 from %89 for the cohort born in 1943. On the other hand, the share of low parental educational level families in Turkey is very high in the older birth cohorts and this share tends to decrease over time. More precisely, 96% on the average for the cohorts born between 1943-1953 to %51 for the cohorts born between 1981-1991 (panel (b)). Thus, the decreasing trend of intergenerational educational persistence stems from this change in the family types over birth cohorts. For this reason, in panel (c) of Figure 1, we distinguish the persistence types over the birth cohorts. According to the findings, the predicted probability of staying low educational level conditional low parental educational level decreases to 56% for the cohort born in 1991 from 90% for the cohort born in 1943. The probability of remaining intermediate educational levels for the descendants having an intermediate parental educational background is almost constant over the birth cohorts. In addition, the probability of keeping the same status for children with high parental educational backgrounds substantially increases across birth cohorts.

Table 3. Intergenerational Educational Mobility Generalized Ordered Logit Regression Estimation

Education Level of Child	Variables	Coef.	Odds Ratio	Rob. Std. Err.	z	P>|z|
High Educ. Level vs. (Low Educ. Level & Intermediate Educ. Level)	Educational Level of Parent	1.685	5.397	0.138	65.89	0.000
	Gender	-0.670	0.512	0.015	– 23.03	0.000
	Urban	-1.098	0.334	0.009	– 40.66	0.000
	Constant	-1.488	0.226	0.017	– 19.45	0.000
(High Educ. Level & Intermediate Educ. Level) vs. Low Educ. Level	Educational Level of Parent	2.083	8.030	0.286	58.56	0.000
	Gender	-0.749	0.473	0.010	– 35.92	0.000
	Urban	-1.098	0.334	0.009	– 40.66	0.000
	Constant	-3.827	0.022	0.002	– 35.54	0.000
	LR Chi-Square	10,832.0				
	Pseudo R-Square	0.1258				
	Obs.	55,348				

(a) Persistence
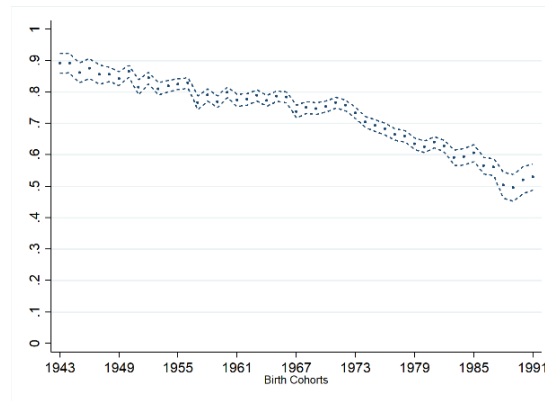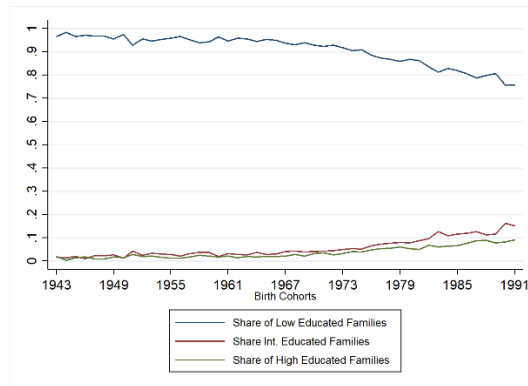
(b) Share of Family Types   c) Types of Persistence
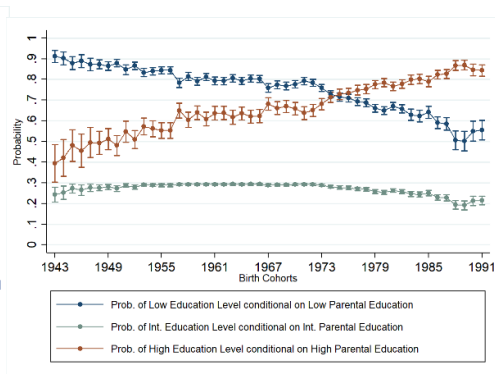
Figure 1. Intergenerational Educational Persistence

From another perspective, predicted probabilities of descendants' educational outcomes conditional on parental education are presented in Figure 2. According to panel (a), as mentioned above, the probability of low educational outcomes for the descendant's conditional on low parental education declines over younger generations. Following this finding, the probability of an intermediate educational outcome for the child who has a lower educational background increases to %25 for the 1991 cohort from 8% for the 1943 cohort. Similarly, the probability of an individual reaching high educational attainment who has a low parental educational background increases from 5% to %20 over the same birth cohorts. Panel (b) shows the predicted probabilities conditional on intermediate parental education. In this regard, the probability of low educational outcomes for the descendants shrinks across birth cohorts from 62% to 22%. In line with this, the probability of high educational outcomes increases over younger generations from 10% to 40%. Thirdly, panel (c) demonstrates the predicted probabilities of a child's educational outcomes conditional on a high parental education level. The probability of a low and intermediate educational outcome for the descendants who have a high parental educational background declines across birth cohorts. Particularly, for the cohorts born after 1985, results indicate that once an individual reaches the top educational outcome, the next generation maintains the same educational attainment.

(a) Conditional on Low Parental Education

(b) Conditional Int. Parental Education

(c)Conditional on High Parental Education

Figure 2. Conditional Intergenerational Educational Transition Probabilities

4.2.1. Intergenerational Educational Mobility and Gender

In this section, we focus on intergenerational educational persistence differences between male and female descendants. According to the results of Table 3, females are disadvantaged with respect to males. Specifically, the probability of higher educational attainment versus low and intermediate educational attainment for females are 0.51 times lower with respect to males given that all the other variables in the model are held constant.

Figure 3 panel (a) presents the intergenerational educational persistence across birth cohorts for males and females. As mentioned above, persistence between child and parents declines across birth cohorts for both males and females. However, the persistence level is substantially higher for females compared to males. More openly, the persistence decreases from 86% to 47% for males from the 1943 birth cohort to the 1991 birth cohort in contrast to %92 to 58% for the same birth cohorts. Additionally, there is an increasing gap between females and males in persistence over time. This divergence between males and females arises from the distinction between persistence types. The probability of remaining in the low educational level who has a low educational background decreases around 50% for the 1991 birth cohort of males from 90% for the 1943 birth cohort in contrast to around 80% from 95% for females. This result implies that there is still large immobility for females from low educational backgrounds even younger generations. Additionally, the probability of high educational outcomes conditional on the high parental educational background is 90% for males with respect to 80% for females in the 1991 birth cohort.

Figure 4 demonstrates predicted probabilities of descendants' educational outcomes conditional on parental educational background for males and females. According to panel (a) of Figure 4, the probability of reaching intermediate and high educational levels for the descendants of low educational backgrounds raises 5% and 3% to 25% respectively for males over the younger birth cohorts. On the other hand, for females, the same probability raises %18 for intermediate education level and %10 for high education level from 3% and %2 respectively. Although the probability of high educational outcome conditional on the intermediate educational attainment of parents increases from 20% to 65% for males in 1943 birth cohorts to 1991 birth cohorts, the same probability for females raises 10% to %40.

(a) Persistence

b) Persistence Types for Males   (c) Persistence Types for Females

Figure 3. Intergenerational Educational Persistence by Gender Breakdown

(a) Conditional on Low Parental Education

(b) Conditional on Intermediate Parental Education
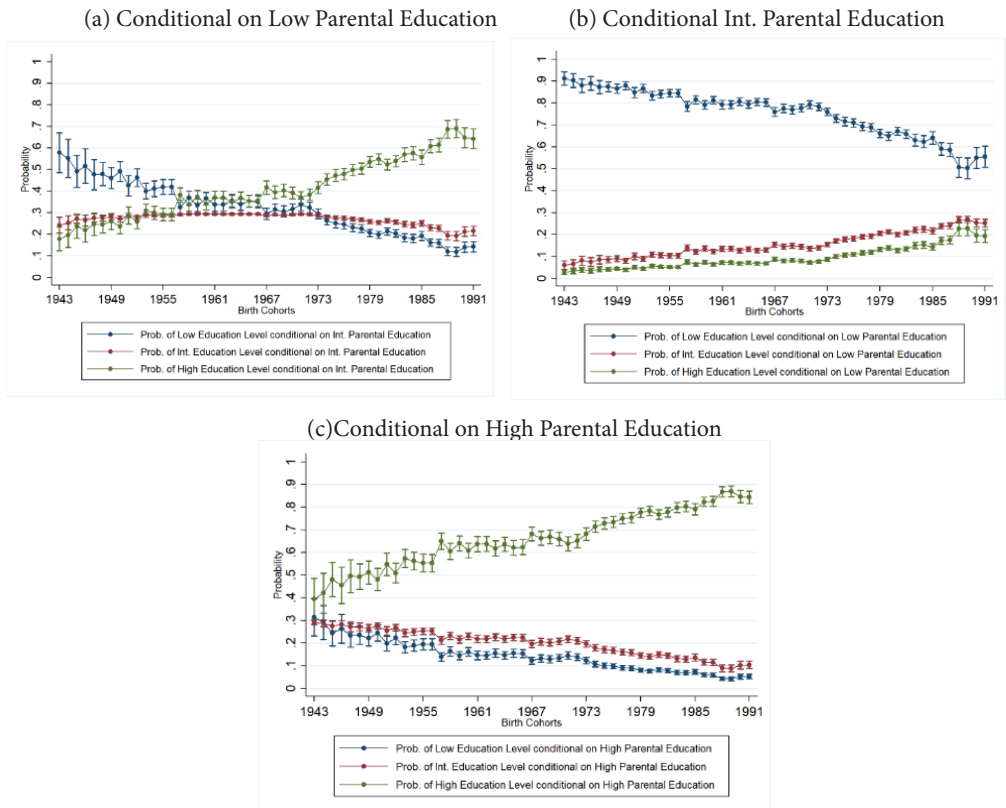

(c) Conditional on High Parental Education
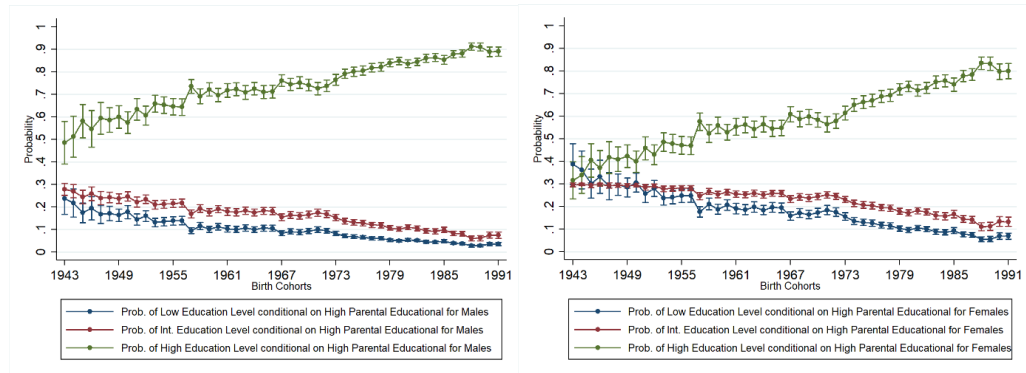
Figure 4. Conditional Intergenerational Educational Transition Probabilities by Gender
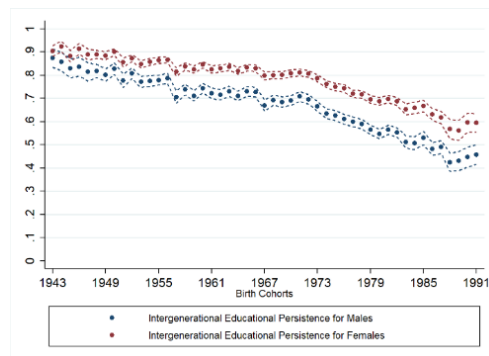
4.2.2. Intergenerational Educational Mobility and Urbanization

As a last step of intergenerational educational mobility, we focus on intergenerational educational persistence differences between urban and rural residencies in this section. According to Table 3, persistence is higher in rural residences relative to urban areas as expected. The odds of higher educational attainment with respect to low and intermediate educational attainment for rural residences are approximately 0.33 lower in rural residencies given that all the other variables in the model are held constant.

According to the results in Figure 5 panel (a), the intergenerational educational persistence across birth cohorts for urban and rural residencies declines across birth cohorts. However, the persistence level is still high for rural areas with respect to urban areas. More clearly, persistence decreases from 87% to 60% in urban areas from the 1943 birth cohort to the 1991 birth cohort in contrast to %92 to 72% for the same birth cohorts. Additionally, there is an increasing gap between urban and rural residencies in persistence over time. This divergence between urban and rural areas stems from the distinction between the share of family types of these residencies. The share of families that have low educational attainment is 100% for the individuals born in 1943 and this share decreases to 91% in 1991. In contrast to this result, the same share decreased by %75 in 1991 from %94. In this regard, the probability of remaining in the low educational level who has a low parental educational background decreases by around 60% for the 1991 birth cohort in urban residencies from 90% for the 1943 birth cohort in contrast to around 82% from the 95% for rural residencies. Similar to the distinction between genders, this result implies major immobility for rural residences even for younger generations. However, in urban residencies probability of high educational outcome conditional on high parental educational background increases 50% to 85% for 1943 to 1991 birth cohorts. The same probability for rural areas is more excessive which is an increase from 25% to 75%. Figure 6 demonstrates predicted probabilities of a child's educational outcomes conditional on parental educational background in urban and rural residencies. According to panel (a) of Figure 6, the probability of reaching intermediate and high educational levels for the descendants of low

educational backgrounds increases by 5% and 3% to 25% and 18% respectively in urban residencies over the younger birth cohorts. However, in rural residencies, the same probability raises %18 for intermediate education level and %8 for high education level from 2% and %1 respectively. Although the probability of high educational outcomes conditional on the intermediate educational attainment of parents increases by 18% to 60% in urban residencies for the 1943 birth cohort to 1991 birth cohort, the same probability in rural areas raises 8% to %35.

(a) Persistence
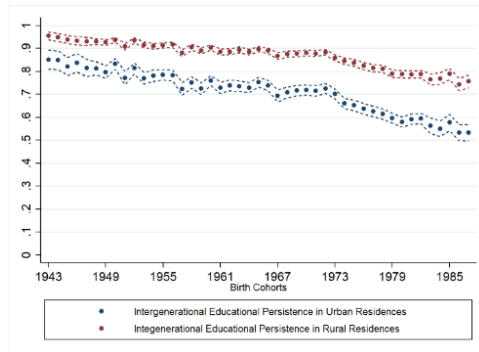
(b) Share of Family Types of Urban and Rural Residences
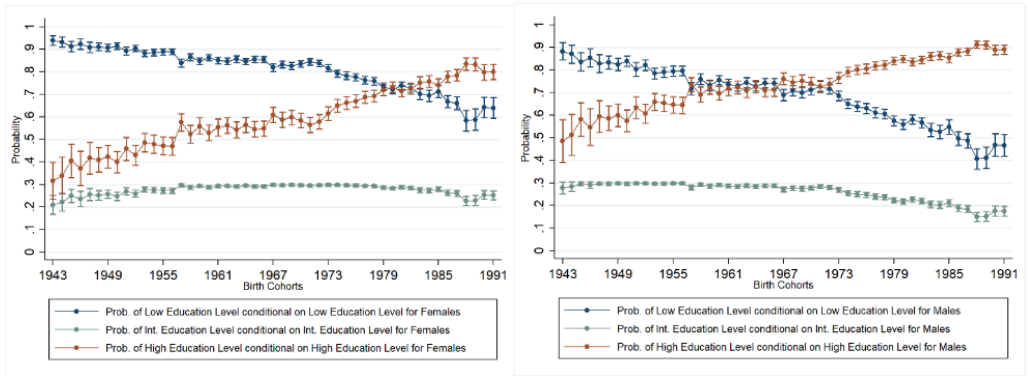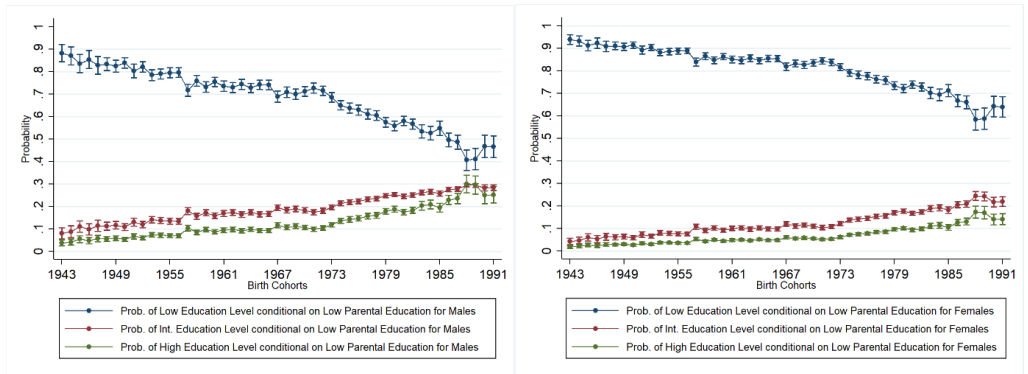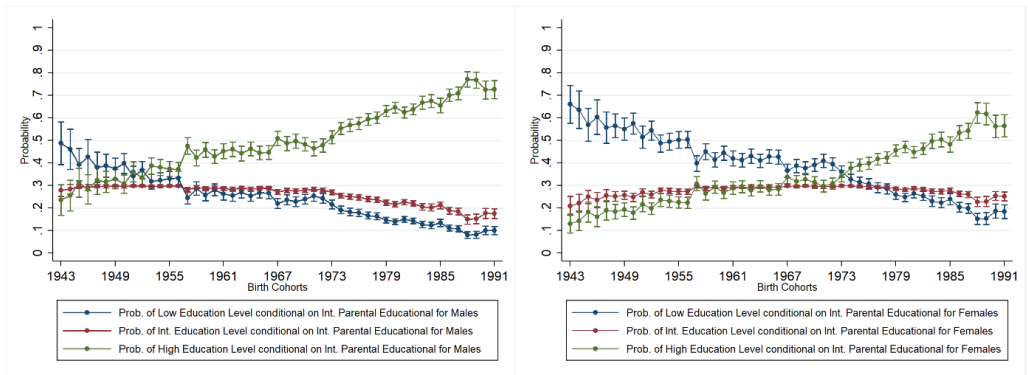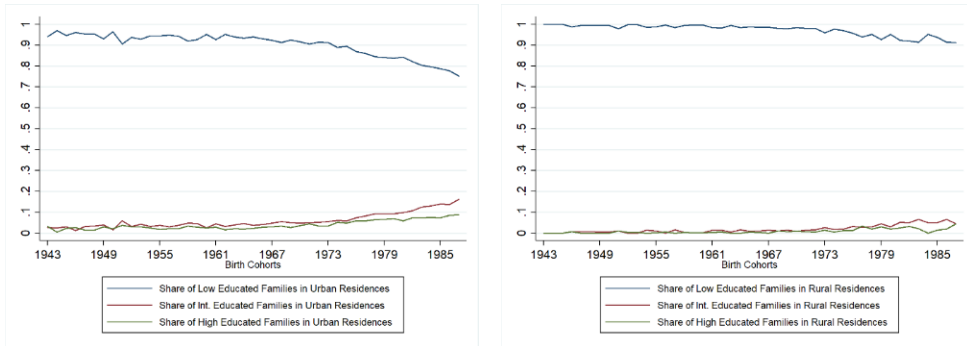

(c) Types of Persistence
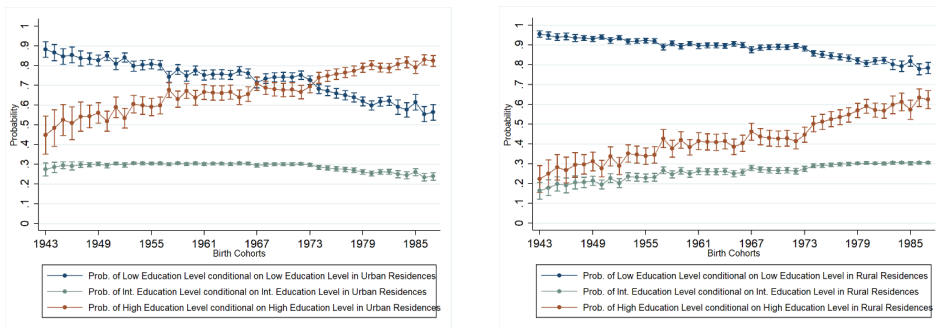
Figure 5. Intergenerational Educational Persistence of Urban and Rural Residences

(a) Conditional on Low Parental Education
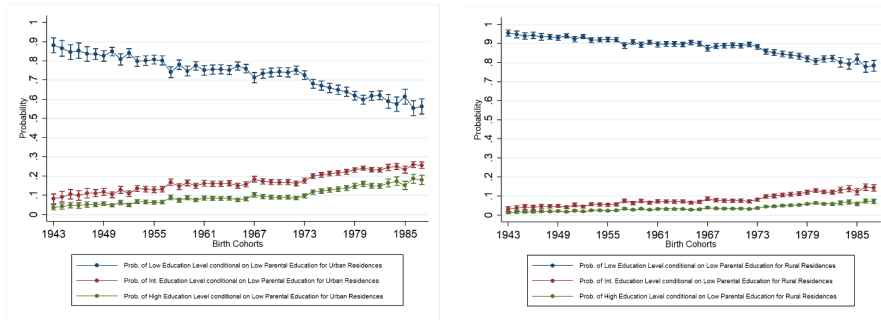
(b) Conditional on Intermediate Parental Education
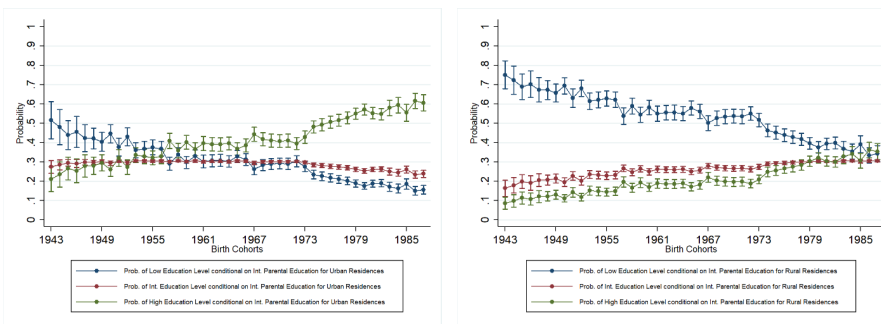

(c) Conditional on High Parental Education
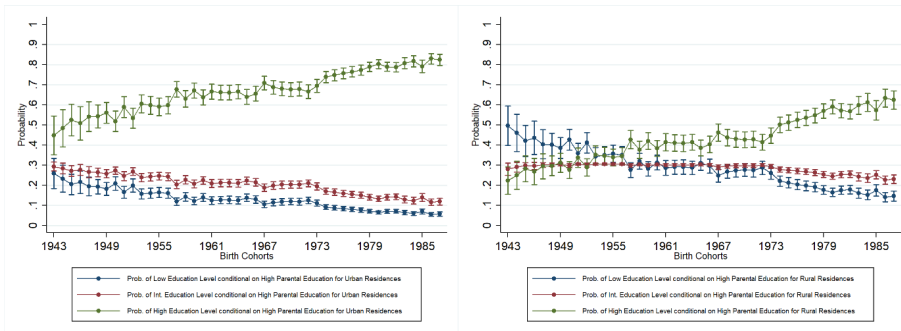
Figure 6. Conditional Intergenerational Educational Transition Probabilities of Urban and Rural Residences

5. Conclusion and Discussion

In conclusion, this study contributes to the emerging literature on intergenerational mobility in Turkey, utilizing data from the Adult Education Survey (AES) provided by TURKSTAT. Our examination of the complex dynamics governing the transmission of socio-economic status across generations underscores the profound implications for societal welfare, economic efficiency, and the realization of equal opportunities.

Since the establishment of the Turkish Republic in 1923, the modernization of the education system took place with the Law on Unification of Education (1924) and free five-year primary education has been compulsory for all citizens in public schools consequently. Undoubtedly, it can be asserted that this initial step serves as the primary trigger of intergenerational mobility. Prior to 1997, the educational system was organized as five years of primary school, three years of middle school, three years of high school, and tertiary education. With the passage of reform legislation in 1997, compulsory primary education was extended to 8 years, and secondary education was restructured as general, vocational, and technical high schools. In 2012, the latest major reform took place, and compulsory education extended to 12 years and divided into three levels of four years each (4+4+4). In accordance with the reforms in compulsory education, educational development statistics and schooling rates have improved since the establishment of the country. As a result of this, Turkey has experienced one of the fastest increases in educational participation among OECD countries. By 2010, primary and secondary school enrolment had reached the OECD average and by 2015 it was universally accessible, a remarkable achievement given the continued increase in the school-age population. The most significant increase was among 15 – to 19-year-olds (high school students), with enrolment rates increasing by 70% between 2005 and 2015. While Turkey's high school enrolment rate remains relatively low among OECD countries (83% compared to an average of 90% in 2020), it is relatively high compared to other upper middle-income countries (60%) (UIS, 2023). As of 2021, 34% of individuals aged 15-19 attend general secondary education, while 25% are enrolled in vocational secondary education in Turkey. In addition, 1% attend lower secondary education programs and 11% attend higher education. In contrast, the OECD average shows that 37% of students are enrolled in general upper secondary programs, 23% in vocational upper secondary programs, 12% in lower secondary programs and 12% in higher education programs (OECD, 2023). This significant enrollment growth has resulted from proactive policies aimed at expanding educational resources, reducing barriers to access, and improving efficiency in the education system. Notable initiatives include significant investments in school infrastructure, the introduction of an electronic student management system in the early 2000s, and the implementation of cash transfer programs and awareness campaigns to increase the participation of girls and socio-economically disadvantaged groups (Şaşmaz, 2015). Mean years of schooling reached 7.87 and 9.41 years in 2019 for females and males with respect to 1.32 and 3.03 years in 1975. The adult illiterate rate decreased by 2.5% in 2019 from 38.9% in 1975 (UIS, 2023). As of 2021, there are 204 universities, 1,828 faculties, and 1,332 vocational schools in Turkey. In this sense, the gross enrollment ratio in tertiary education increased to 115% in 2019 from 5.1% in 1971 (UIS, 2021) [1].

The significant educational expansion that Turkey has experienced since its founding requires emphasizing the distinction between absolute and relative in the literature on intergenerational mobility. Absolute mobility assesses the overall progress of all children relative to their parents, closely linked to structural changes and overall economic growth (e.g. changes in compulsory

---

1   Gross enrollment ratio may exceed 100% as it includes students who are older or younger than their grade level due to early or late entry and grade repetition (UIS, 2021).

education, changes in occupational or class structure). This can be measured by examining the proportion of children who achieve higher living standards than their parents as adults. In contrast, relative mobility, often referred to in sociology as "social fluidity", measures the extent to which an individual's economic status is related to the economic status of their parents. This approach abstracts from overall economic development and structural changes. In this study, the concept of intergenerational persistence is related to absolute mobility figures due to data limitations.

In this context, the research results underline three points. Firstly, for an individual with a higher parental educational background, higher educational attainment is greater than for an individual with a low and intermediate parental educational background. In addition, the probability of having the same level of education as the education level of the family, in other words, persistence declines over birth cohorts. To illustrate, the persistence rate dropped from 89% for those born in 1943 to 53% for those born in 1991. This is driven by the educational expansion that has taken place in the country, the prevalence of families with low parental education is notably high in older birth cohorts in Turkey, but this trend appears to decrease over time. To elaborate, the average percentage decreased from 96% for cohorts born between 1943-1953 to 51% for cohorts born between 1981-1991.

Secondly, the level of persistence is notably high among females compared to males. Specifically, for males, persistence drops from 86% to 47% between the 1943 and 1991 birth cohorts, while for females, it decreases from 92% to 58% over the same periods. Moreover, a growing disparity in persistence between females and males is observed over time. This divergence is attributed to differences in persistence types. The likelihood of remaining in a low educational level for males with a low educational background decreases by approximately 50% for the 1991 birth cohort, compared to a decline from 90% to around 80% for females from the 1943 to 1991 birth cohorts. This finding suggests substantial immobility for females with low educational backgrounds, even among younger generations. Additionally, in the 1991 birth cohort, the probability of achieving high educational outcomes, given a high parental educational background, is 90% for males, contrasting with 80% for females.

Thirdly, the intergenerational educational persistence in both urban and rural areas shows a decline across different birth cohorts. However, the persistence remains notably higher in rural regions compared to urban areas. To elaborate, in urban settings, persistence decreases from 87% to 60% from the 1943 birth cohort to the 1991 birth cohort, while in rural areas, it decreases from 92% to 72% over the same periods. Moreover, there is a growing disparity in persistence between urban and rural residences over time. This divergence is attributed to differences in the distribution of family types in these areas. The percentage of families with low educational attainment is 100% for individuals born in 1943, decreasing to 91% in 1991 in urban areas. In contrast, the same percentage decreases by 75% in rural areas from 94% to 1991. Consequently, the likelihood of remaining in a low educational level for individuals with low parental educational

backgrounds decreases by around 60% for the 1991 birth cohort in urban areas, contrasting with a decrease from 90% to around 82% for rural areas between the 1943 and 1991 birth cohorts.

Assuming that parents aim to maximize their children's incomes alongside their own consumption, it is generally anticipated that private investments in children's human capital will increase with both parental income and parental human capital (Becker & Tomes, 1979, 1986; Loury, 1981). Consequently, offspring born to highly educated parents are expected to enjoy a twofold advantage. They not only benefit from exposure to their parents' elevated human capital but also from the higher monetary investments made by their parents in their human capital (Guryan et al., 2008; Ramey & Ramey, 2010; Duncan & Murnane, 2011). When children born to educated parents and parental investments in their human capital complement each other meaning the efficiency of investments in children's human capital increases alongside income they experience even greater advantages. This assumption appears reasonable, as indicated by various studies (Lareau, 2011; Heckman & Mosso, 2014). They may reside in neighborhoods with superior schools, facilitating interaction between their children and similarly advantaged peers. Additionally, they can provide support with homework, introduce them to books, engage in educational games, arrange private lessons, and more. This situation implies that the persistence of human capital across generations will strengthen as incomes increase. Credit market imperfections may further exacerbate the intergenerational transfer of human capital, potentially reducing intergenerational mobility, particularly for families at the lowest end of the income distribution. Limited access to credit for low-income parents investing in their children may lead to the transmission of lower levels of human capital from one generation to the next. Restuccia and Urrutia (2004) discovered that around 50% of intergenerational earnings continuity could be explained by parents' investments in their children's education. Therefore, recognition of societal investments in the educational sphere wields substantial influence not only on economic prosperity but also on the cultivation of a more equitable distribution of opportunities, thereby advancing principles of social justice. Consequently, our study advocates for targeted policies aimed at mitigating educational inequalities, with a view towards fostering a society where individuals are empowered to transcend the circumstances of their birth.

References

Akarçay-Gürbüz, A., & Polat, S. (2017). Schooling Opportunities and Intergenerational Educational Mobility in Turkey: An IV Estimation Using Census Data. *The Journal of Development Studies, 53*(9), 1396-1413.

Attanasio, O., & Kaufmann, K. (2009). Educational Choices, Subjective Expectations, and Credit Constraints. *NBER Working Paper No. 15087.*

Aydemir, A., & Yazıcı, H. (2019). Intergenerational Education Mobility and the Level of Development. *European Economic Review, 116*(C), 160-185.

Bakış, O. (2017). Kuşaklar Arası Eğitim Hareketliliği: AB-Türkiye Karşılaştırması. *Finans Politik & Ekonomik Yorumlar, 54*(634), 97-105.

Becker, G. S. (1975). *Human capital: : A Theoretical and Empirical Analysis, with Special Reference to Education, Second Edition.* Chicago: University of Chicago Press.

Becker, G. S., & Tomes, N. (1979). An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility. *Journal of Political Economy, 87*(6), 1153-1189.

Becker, G. S., & Tomes, N. (1986). Human Capital and the Rise and Fall of Families. *Journal of Labor Economics, 4*(3), S1-S39.

Behrman, J. R., & Rosenzweig, M. R. (2002). Does Increasing Women's Schooling Raise the Schooling of the Next Generation? *American Economic Review, 92*(1), 323-334.

Bingley, P., Christensen, K., & Jensen, V. M. (2009). Parental Schooling and Child Development: Learning from Twin Parents. *The Danish National Centre for Social Research Working Paper 07:2009.*

Björklund, A., & Salvanes, K. G. (2011). Education and Family Background: Mechanisms and Policies. E. A. Hanushek, S. Machin, & L. Woessman (Dü) içinde, *Handbook of the Economics of Education* (Cilt 3, s. 201-247). Elsevier B.V.

Björklund, A., Lindahl, M., & Plug, E. (2006). The Origins of Intergenerational Associations: Lessons from Swedish Adoption Data. *The Quarterly Journal of Economics, 121*(3), 999-1028.

Black, S. E., & Devereux, P. (2010). Recent Developments in Intergenerational Mobilty. *IZA Discussion Paper No.4866.*

Black, S. E., Devereux, P. J., & Salvanes, K. G. (2005). Why the Apple Doesn't Fall Far: Understanding Intergenerational Transmission of Human Capital. *American Economic Review, 95*(1), 437-449.

Card, D. (1999). The Causal Effect of Education on Earnings. O. Ashenfelter, & D. Card (Dü) içinde, *Handbook of Labor Economics* (Cilt 3). Elsevier Science B.V.

Card, D. (2012). Earnings,Schooling, and Ability Revisited. S. Polachek, & K. Tatsimaros içinde, *35th Anniversary Retrospective (Research in Labor Economics, Vol. 35)* (s. 111-136). Leeds: Emerald Group Publishing Limited.

Checchi, D., Fiorio, C. V., & Leonardi, M. (2008). Intergenerational Persistence in Educational Attainment in Italy. *IZA Discussion Paper No.3622.*

Checchi, D., Ichino, A., & Rustichini, A. (1999). More equal but less mobile? Education Financing and Intergenerational Mobility in Italy and in the US. *Journal of Public Economics, 74*, 351-393.

Chetty, R., Friedman, J. N., Saez, E., Turner, N., & Yagan, D. (2017). Mobility Report Cards: The Role of Colleges in Intergenerational Mobility. *NBER Working Paper No. 23618.*

Chetty, R., Hendren, N., Kline, P., & Saez, E. (2014). Where is the land of Opportunity? The Geography of Intergenerational Mobility in the United States. *The Quarterly Journal of Economics, 129*(4), 1553-1623.

Chevalier, A. (2004). Parental Education and Child's Education: A Natural Experiment. *IZA Discussion Paper No.1153.*

Chevalier, A., Denny, K., & McMahon, D. (2009). A Multi-Country Study of Inter-generational Educational Mobility. R. Apslund, E. Barth, & P. Dolton (Dü) içinde, *Education and Inequality across Europe.* Massachusetts: Edward Edgar.

D'Addio, A. C. (2007). Intergenerational Transmission of Disadvantage: Mobility or Immobility Across Generations. *OECD Social, Employment and Migration Working Papers No.52.*

Dearden, L., Machin, S., & Reed, H. (1997). Intergenerational Mobility in Britain. *The Economic Journal, 107*(440), 47-66.

Demirtaş, N. M., & Torul, O. (2023). Intergenerational Income Mobility in Turkey. *The Journal of Economic Inequality.*

Duncan, G. J., & Murnane, R. J. (2011). *Whither Opportunity?: Rising Inequality, Schools, and Children's Life Chances.* Russell Sage Foundation.

Emran, M., & Shilpi, F. (2019). Economic Approach to Intergenerational Mobility: Measures, Methods and Challenges in Developing Countries. *WIDER Working Paper 2019/98.*

Erikson, R., Goldthorpe, J., & Portocarero, L. (1979). Intergenerational Class Mobility in Three Western European Societies: England, France and Sweden. *The British Journal of Sociology*, 415-441.

Formby, J., Smith, W., & Zheng, B. (2004). Mobility Measurment, Transition Matrices and Statistical Inference. *Journal of Econometrics, 120*, 181-205.

Galton, F. (1869). *Hereditary genius: An inquiry into its laws and consequences.* London: Macmillan and Co.

Goldthorpe, J. H. (2014). The Role of Education in Intergenerational Social Mobility: Problems from Empirical Research im Sociology and Some Theoretical Pointers from Economics. *Rationality and Society*, 265-289.

Guryan, J., Hurst, E., & Kearney, M. (2008). Parental Education and Parental Time with Children. *Journal of Economic Perspectives, 22*(3), 23-46.

Haegeland, T., Kirkeboen, L. J., Raaum, O., & Salvanes, K. G. (2010). Why Children of College Graduates Outperform Their Schoolmates: A Study of Cousins and Adoptees. *Norwegian School of Economics Department of Economics Discussion Paper No.22/10.*

Heckman, J. J., & Mosso, S. (2014). The Economics of Human Development and Social Mobility. *Annual Review of Economics, 6*(1), 689-733.

Hertz, T., Jayasundera, T., Piraino, P., Selçuk, S., Smith , N., & Verashcagina, A. (2007). The Inheritance of Educational Inequality: International Comparisons and Fifty-Year Trends. *The B.E. Journal of Economic Analysis & Policy, 7*(2), Article 10.

Holmlund, H., Lindahl, M., & Plug, E. (2008). The Causal Effect of Parent's Schooling on Children's Schooling: A Comparison of Estimation Methods. *IZA Discussion Paper No.3630.*

Kim, C., Tamborini, C. R., & Sakamoto, A. (2015). Field of Study in College and Lifetime Earnings in the United States. *Sociology of Education, 88*(4), 320-339.

Lareau, A. (2011). *Unequal Childhoods: Class, Race, and Family Life.* University of California Press.

Leone, T. (2019). Intergenerational Mobility in Education: Estimates of the Worldwide Variation. *United Nations Research Institute for Social Development: Overcoming Inequalities in a Fractured World: Between Elite Power and Social Mobilization. Occasional Paper No.2.*

Loury, G. C. (1981). Intergenerational Transfers and the Distribution of Earnings. *Econometrica, 49*(4), 843-867.

Maurin, E., & McNally, S. (2008). Vive la Révolution! Long-Term Educational Returns of 1968 to the Angry Students. *Journal of Labor Economics, 26*(1), 1-33.

Mercan, M. A. (2012). Intergenerational Income Mobility in Turkey. *İktisat İşletme ve Finans, 27*(318), 83-94.

Mercan, M. A. (2020). Are Occupations of Parents Important? Evidence from Turkey. *International Journal of Economics and Financial Research, 6*(1), 1-4.

Mincer, J. (1974). *Schooling, Experience and Earnings.* New York: Columbia University Press.

Monsen, C. (2018). Upward Intergenerational Mobility of College Students: Does the Type of Institution Matter? *The Park Place Economist, 26.*

Narayan, A., Van der Weide, R., Cojocaru, A., Lakner, C., Redaelli, S., Mahler, D. G., . . . Thewissen, S. (2018). Fair Progress? Economic Mobility across Generations around the World. *The World Bank Group, Equity and Development Series.*

OECD. (2023). *Education at a Glance.* OECD.

Oreopoulos, P., Page, M. E., & Stevens, A. H. (2006). The Intergenerational Effects of Compulsory Schooling. *Journal of Labor Economics, 24*(4), 729-760.

Öztunalı, O., & Torul, O. (2019). Evolution of Intergenerational Educational Mobility in Turkey. *BOUN*.

Öztunalı, O., & Torul, O. (2020). The Evolution of Intergenerational Educational Mobility in Turkey. *Emerging Markets Finance and Trade*, 1-17.

Plug, E. (2004). Estimating the Effect of Mother's Schooling on Children's Schooling Using a Sample of Adoptees. *American Economic Review, 94*(1), 358-368.

Ramey, G., & Ramey, V. (2010). The Rug Rat Race. *Brookings Papers on Economic Activity, 41*(1), 129-199.

Restuccia, D., & Urrutia, C. (2004). Intergenerational Persistence of Earnings: The Role of Early and College Education. *American Economic Review, 94*(5), 1354-1378.

Richey, J., & Rosburg, A. (2015). Decomposing Economic Mobility Transition Matrices. *MPRA Paper No.66485*.

Shorrocks, A. (1978). The Measurement of Mobility. *Econometrica, 46*(5), 1013-1024.

Solon, G. (1992). Intergenerational Income Mobility in the United States. *The American Economic Review, 82*(3), 393-408.

Solon, G. (1999). Chapter 29 – Intergenerational Mobility in the Labor Market. O. C. Ashenfelter, & D. Card (Eds.), *Handbook of Labor Economics* (Volume 3 Part A, s. 1761-1800). Elsevier.

Solon, G. (2002). Cross-Country Differences in Intergenerational Earnings Mobility. *Journal of Economic Perspectives, 16*(3), 59-66.

Solon, G. (2004). A Model of Intergenerational Mobility Variation over Time and Place. M. Corak (Dü.) içinde, *Generational Income Mobility in North America and Europe* (s. 38-47). Cambridge University Press.

Şaşmaz, A. (2015). *Politics of Educational Expansion in Turkey.* Paris: UNESCO Global Monitoring Report.

Tansel, A. (2015). Intergenerational Educational Mobility in Turkey. *IZA Discussion Paper Series No. 9590*.

Thompson, J. (2019). Mobility in the middle: Bachelor's degree selectivity and the intergenerational association in status in the United States. *Research in Social Stratification and Mobility, 60*, 16-28.

Torche, F. (2005). Unequal but Fluid: Social Mobility in Chile in Comparative Perspective. *American Sociological Review*, 421-450.

Torche, F. (2011). Is a College Degree Still the Great Equalizer? Intergenerational Mobility across Levels of Schooling in the United States. *American Journal of Sociology, 117*(3), 763-807.

UIS;. (2021). *UIS Statistics on Education.*

van der Weide, R., Lakner, C., Mahler, D. G., Narayan, A., & Ramussubbaiah, R. (2021). Intergenerational Mobility around the World. *World Bank Policy Research Working Paper 9707*.

World Bank. (2015). *Educational Statistics.*

Zimmerman, D. (1992). Regression Toward Mediocrity in Economic Status. *The American Economic Review, 82*(3), 409-429.

RESEARCH ARTICLE

THE EFFECT OF THE EXISTENCE OF CHIEF RISK OFFICER (CRO) ON BANK PERFORMANCE

Ayşe Nur GÜNGÖR BOSTAN[*] ID
Aslı AYBARS[**] ID

Abstract

Over the past few years, numerous studies have examined how top management affects financial performance. These studies highlight the significance of management teams' characteristics and qualities as key factors influencing firms' financial performance. This study focuses on the growing prevalence of Chief Risk Officers (CROs) in the banking industry. It aims to investigate the impact of CROs on the financial performance of banks in the North American Bank sample. The primary objective of this paper is to address the existing gap in the literature by exploring whether there are performance differences between banks that employ CROs and those that do not. This study is based on panel data methodology and the findings of this study provide evidence of a positive correlation between bank size and the presence of a CRO. However, no significant relationship is found between the existence of a CRO and stock return volatility or bank profitability. It is observed that banks with higher volatility levels tend to hire CROs as part of their management team. Consequently, the results suggest that riskier banks are more inclined to employ CROs compared to their safer counterparts.

Keywords: Chief risk officer (CRO), performance, bank, panel data analysis.

JEL Classification: G21, G32, G34

1. Introduction

The most recent financial crisis severely impacted banking industry. Therefore, interest in enterprise risk management grew significantly in recent years (Liebenberg and Hoyt, 2003). For banks to maintain a sustainable financial structure, focusing on risk management became crucial. Especially, banks face many risks such as credit risk, currency risk, etc. Hiring a risk officer is a major indication for a firm about management's perception towards risk. The top management team's effect on firm performance became a theory with upper echelons perspective. The upper echelon theory was developed by Hambrick and Mason in 1984. The theory states that organizational outcomes, strategic choices, and performance levels are partially predicted

---

[*] Marmara University, Faculty of Business Administration, PhD Candidate, E-mail: aysenurbostan@marun.edu.tr, ORCID: 0009-0008-8972-3040

[**] Marmara University, Faculty of Business Administration, E-mail: asli.aybars@marmara.edu.tr, ORCID: 0000-0002-7899-2367

by managerial background characteristics. Accordingly, this study focuses on many hypotheses about top management team's effects on performance. In terms of upper echelon point of view, many studies have been conducted and also different hypotheses have been developed. For example, King et al., (2016) published a paper which is about the influence of CEO education on bank performance and they found that management education delivers skills enabling CEOs to manage increasingly larger and complex banks and achieve successful performance outcomes. Hamid Mehran (1995) published a paper which investigated whether firm performance affected by compensations and the study finds that firm performance is positively related to the percentage of equity held by managers and to the percentage of their compensation that is equity based.

The study by Fahlenbrach and Stulz (2011) about bank CEO incentives and the credit crisis, investigated whether bank performance during the credit crisis is related to chief executive officer incentives before the crisis. In recent years, the concept of CROs managing risk management activities has gained importance. Colquitt et al. (1999) conducted a survey among firms listed in Business Insurance Risk Management Services to evaluate the characteristics and extent of integrated risk management. Their survey revealed that 6.6 percent of these firms reported having an individual with the title of 'Chief Risk Officer' within the company. The results also refer to the traditional risk management concept and according to this, the managers who are responsible for risk management are not given a board level title. The results of this study point out that the respondents' answers suggest the trend toward risk management integration continues. More traditional way of managing risk turned to enterprise risk management (ERM) concept and ERM calls for high level oversight of a company's entire risk portfolio rather than for many different overseers managing specific risks. Furthermore, ERM centralizes management under a CRO or ERM committee who manages the individual overseers to help identify overall how much risk the entity can tolerate, assess mitigation tactics and otherwise take advantages of risk opportunities (Banham, 2005). The role of Chief Risk Officer has begun to gain worldwide acceptance and momentum, a trend that began in the U.S. financial services industry and has extended into Europe and Asia as well as other industries such as energy and non-financial corporations (Lam, 2001). Under the rules issued after crises, the biggest U.S. bank-holding companies are required to have a CRO and a risk committee on the company's board of directors (Sterngold, 2014). There is also evidence that managers in firms with CROs overseeing ERM programs felt more confidence in the efficacy of their risk management system (Pernell et al., 2017). According to Deloitte survey results, assigning an individual executive responsibility for ERM is positively correlated with the level of preparedness to manage risk (Deloitte 2008:15). In recent years, however, corporate risk management has expanded well beyond insurance and hedging of financial exposures to include other kinds of risks such as operational risk, reputational risk, and most recently strategic risk so that the risk management function is now directed often by a senior executive with the title of Chief Risk Officer (CRO) (Nocco and Stulz, 2006). In the related literature, the studies which focus on firm performance in the view of enterprise risk management are common. According to Cumming and Hirtle (2001), Lam (2001), and Meulbroek (2002); enterprice risk management benefits firms by decreasing earnings and stock price volatility, reducing external capital costs, increasing capital

efficiency, and creating synergies between different risk management activities. Baxter et al. (2012) focusing on the global financial crisis, suggest that there is no relation between ERM quality and market performance prior to and during the market collapse. Grace et al. (2015) examine risk management practices in the insurance industry and they find that insurance company with CRO, dedicated risk committees, and risk management entities that report to Chief Financial Officers experience higher cost efficiency and return on assets. Quon et al. (2012) examine enterprise risk management and firm performance on non-financial firms in their paper. According to findings of this study, the assessed levels of economic or market risk exposure or consequences are not related to firm performance. Smithson and Simkins (2005) examine an empirical study on risk management and the value of the firm. Their findings show that the evidences about risk management increasing firm value are fairly limited. Beasley et al. (2008) examine equity market reactions to announcement of appointments of senior executive officers.

The literature related with risk management activities for banks is another hot and contemporary topic. The existence of a Chief Risk Officer (CRO) has the potential to significantly improve bank performance. A CRO is responsible for setting, monitoring, and managing risk levels and policies within a bank. This includes managing risk associated with credit, liquidity, market, operational, and other risks. By having a dedicated individual to oversee risk management, banks can more effectively identify and manage risk. CROs also ensure that banks are compliant with regulatory requirements and internal policies. This helps to provide a more secure environment for customers and investors, which can lead to increased confidence in the bank. In addition, CROs can identify potential risks and develop strategies to mitigate them. This can help to prevent potential disasters such as financial crises, which can lead to significant losses for a bank. Overall, the presence of a CRO can help to improve the performance of a bank by providing better risk management and compliance practices. This can lead to increased confidence in the bank, better risk management, and improved performance. For instance, Fahlenbrach and Stulz (2011) investigate the role of risk management in risk reduction. In another study performed by Bailey (2019), it has been found that expertise in the CRO role is particularly important during the financial crisis. According to the findings of Pernell et al. (2017), when banks hire CRO in their upper management team; the usage of risky derivatives are significantly increased to maximize profitability. Another significant finding is revealed by Bailey (2019), and this paper examines insurance companies and finds that if CRO has expertise in a prior high-level risk management role, the contribution of the firm's profitability is positively significant. According to the findings about risk management in insurance companies in the study of Liebenberg and Hoyt (2003); it is suggested that enterprise risk management can be used to increase the value of insurance companies. Lundqvist and Vilhelmsson (2018) investigate the relationship between the degree of Enterprise Risk Management (ERM) and default risk in a panel dataset covering 78 of the world's largest banks and ERM implementation is not found to be a significant determinant of credit ratings that represent default risk and financial ratios according to their findings. Pagach and Warr (2010) study on a dataset of 106 U.S. firms, which are mostly financial firms and announce hiring a CRO. They find that some firms hiring CRO experience a reduction in earnings volatility

but in general they find weak impact of CRO on a wide range of firm variables. These results are consistent with our study's findings that will be revealed in the forthcoming sections.

As far as the literature review is concerned, no study has been found investigating the effect of hiring CRO on the bank performance. Accordingly, in this study, the effect of CRO hiring on bank performance will be investigated on the data set of Compustat North America and Execucomp which are merged for the period between 1992-2014. The paper proceeds as follows. In Section 2, the sample of banks will be introduced. In Section 3, hypothesis and variables will be explained. In Section 4, the descriptive statistics and results of the analysis will be presented. Section 5 is devoted to the conclusion and discussion of the results.

2. Sample Selection

This study utilizes data extracted from Execucomp database regarding management team properties. Execucomp database is used as the starting point of the sample. Also, Compustat North America database is used for extracting the financials of banks. Accordingly, Execucomp and Compustat databases are merged in this study. Period of Execucomp database is starting from 1992 until 2014. So, the period of the data downloaded from Compustat database is chosen to cover the years between 1992-2014 to comply with Execucomp database. The sample is restricted as to comply with the paper of Fahlenbrach and Stulz (2011) that focuses on Bank CEO incentives and credit crisis. Firm-year observations for firms are downloaded by using Standard Industry Classfication (SIC) codes between 6000 and 6300 for the period of 1992 and 2014. The firms with SIC code 6282 (Investment Advice) are excluded, because these are not in the lending business. The initial sample has 2,989 bank-year observations and is based on a total of 340 banks. After missing variables are excluded from the sample, the final sample comprises 1,575 bank-year observations belonging to 186 banks.

The variables related to non-interest income and deposits are not in the Compustat database so these variables are extracted from Compustat-Bank database. Bank size, equity capital, charter value, and retained earnings variables are generated from Compustat database. Volatility variable is taken from CRSP database. Variables with respect to macroeconomic conditions are taken from Federal Reserve Bank of Philadelphia website and merged into the main sample.

In Table 1, the number of observations is demonstrated by years. The total number of observations is 1,575 and 406 of them represent the existence of CRO in the banks. So, 74.22% of total observations do not have a CRO with the remaining 25.78% of the observations having a CRO.

Table 1: Number of Observations by Year

Years	Without CRO	With CRO	CRO %	Total
1994	6	0	0	6
1995	18	0	0	18
1996	15	1	6.3	16
1997	11	1	8.3	12
1998	19	2	9.5	21
1999	67	14	17.3	81
2000	68	16	19.0	84
2001	73	14	16.1	87
2002	70	16	18.6	86
2003	70	19	21.3	89
2004	67	20	23.0	87
2005	67	17	20.2	84
2006	73	16	18.0	89
2007	74	25	25.3	99
2008	82	31	27.4	113
2009	73	32	30.5	105
2010	69	34	33.0	103
2011	66	32	32.7	98
2012	62	37	37.4	99
2013	59	41	41.0	100
2014	60	38	38.8	98
Total	**1,169**	**406**		**1,575**
Percentage	**74.22%**	**25.78%**		

3. Hypothesis Development

This study's hypothesis centers on the impact of a Chief Risk Officer (CRO) on bank performance. We utilize Return on Assets (ROA), a metric that represents bank profitability, as our primary measure. ROA is calculated as the ratio of net income to the total book value of assets. In defining control variables, we follow the framework established by King et al. (2016), who investigated the effects of CEO education on bank performance. The hypothesis of our study is formulated as follows:

H1: Existence of CRO in the bank is positively associated with higher performance.

Accordingly, ROA represents performance criteria as the dependent variable. Additionally, selected control variables that take into year effect is utilized in the econometric model so that the model is displayed as below;

$$Bank\ Performance_{i,t+1} = \beta_0 + \beta_1 CRO_t + \beta_2 Controls_t + Year_t + \varepsilon_{i,t} \qquad (1)$$

In the model 1 above, CRO is designed as dummy variable. If the bank hires a CRO, the variable is described as 1 and if not described as 0.

We follow King et al. (2016) in choosing our control variables that include; bank size, equity capital, charter value, deposits, volatility, non-interest income, retained earnings, and macroeconomic conditions. The aforementioned study focuses on a specific trait of management team such that the link between CEO education and bank performance is examined. Our study focuses on the relationship between upper management team that is directed by CRO and bank performance. The details of control variables are demonstrated in Appendix 1.

4. Descriptive Statistics and Regression Results

a. Descriptive Statistics

This paper's primary measure of firm performance as a proxy for bank profitability is defined as bank ROA and as consistent with the study of King et. al. (2016), industry adjusted ROA is created, which is defined as a bank's ROA minus the mean ROA of all other banks on a per annum basis. Prior studies have shown that differences in bank size may have a positive impact on profitability due to economies of scale (Westman, 2011). A more complicated management structure, with an increasing number of managerial layers, may reduce the efficiency of large banks (Williamson, 1967). So, in this study, Bank size (natural logarithm of total assets), Equity capital (fraction of equity to total assets) and Charter value (logarithm of market to book value of equity) are utilized as control variables. According to Demirgüç-Kunt and Huizinga (2010), in response to banking deregulation as described earlier, banks are increasingly relying on non-traditional sources of income to improve profit margin and diversify risk. In line with the study of King et al. (2016); non-interest income, which is measured as the ratio of non-interest income to total assets, is also controlled. Furthermore, deposits (fraction of customer deposits to assets) are also controlled to capture how variation in funding models impact profitability (King et. al. 2016). According to Demirgüç-Kunt et al. (2013), banks which fund operations with a larger fraction of deposits are less likely to face funding fragility. Evidence shows that banks that follow riskier policies and retain larger amounts of earnings are more likely to perform better (Adams et al., 2012). In accordance with King et al. (2016), volatility and retained earnings (fraction of retained earnings to assets) are controlled. Whereas in the study of King et al. (2016), volatility is taken as the standard deviation of daily stock returns, in this study volatility is computed as the standard deviation of monthly stock returns. And also, to comply with the literature, macro-economic conditions which are measured at the Federal Reserve Bank of Philadelphia's state-coincident index are also controlled.

Table 2 shows descriptive statistics for the selected variables of the model. In this study, the mean result for profitability, measured as ROA, is 0.27 An average bank in the sample holds 9.5% equity capital and has high charter value. The findings in this study with respect to equity capital, charter value, non-interest income, deposits, retained earnings are consistent with the current literature

findings. Bank size and volatility change from sample to sample so the results are consistent with some other studies in the literature.

Table 2: Descriptive Statistics for Full Sample

	Mean	Sd	p50	p25	p75	Min	Max
Profitability	0.027	0.016	0.027	0.015	0.039	-0.018	0.065
Bank size	9.569	1.425	9.258	8.545	10.342	7.329	14.085
Equity capital	0.095	0.029	0.091	0.076	0.108	0.036	0.214
Charter value	0.685	0.394	0.592	0.427	0.828	0.076	2.543
Non-interest income	0.017	0.015	0.013	0.008	0.021	-0.000	0.107
Deposits	0.698	0.105	0.706	0.631	0.780	0.341	0.886
Volatility	0.086	0.052	0.073	0.051	0.105	0.026	0.333
Retained earnings	0.047	0.035	0.049	0.028	0.069	-0.081	0.131
Macroeconomic conditions	94.240	8.902	95.220	88.120	100.160	63.270	119.780
Observations	1,575						

Note: Table 2 presents descriptive statistics of variables. This table shows summary statistics for 1,575 bank year observations. P25, P50(median), p75 represents quartile values for the variables. Profitability is the industry-adjusted measure of bank profitability, defined as bank ROA minus the mean ROA of all other banks per annum. Bank Size is calculated as the natural log of total assets. Equity Capital represents the ratio of total equity to assets. Charter Value is the log of the market-to-book value of equity. Non-interest Income is calculated as the fraction of non-interest income to total assets. Deposits presents the ratio of customer deposits to assets. Volatility is the standard deviation of daily stock returns. Retained Earnings is the fraction of retained earnings to assets. Macroeconomic Conditions represents Coincident Index for each state where a bank is headquartered as provided by Federal Reserve Bank of Philadelphia.

The mean difference results are presented in Table 3 below. The table represents the differences between the banks that hire a CRO or not. In terms of profitability, bank size, charter value, non-interest income, deposits, volatility, and retained earnings; the differences are statistically significant at %1. The banks which are larger in size hire CRO more than the banks which are smaller in size. The banks whose volatility level is high, hire CRO in their management team. So, it can be inferred from the results that more risky banks tend to hire more CROs in comparison to the banks that are less risky. This result is consisted with the findings of Pagach and Warr (2011) suggesting that larger firms and those with greater exposure to risk are more likely to recognize the potential benefits of ERM and are more likely to invest in a CRO to oversee the implementation of ERM strategies. This indicates that firms recognize the importance of managing risk in order to maximize returns and minimize losses, and are willing to invest in the necessary personnel to ensure proper risk management.

Table 3: Mean Differences Table

	Without CRO Mean N=1169	With CRO Mean N=406	Diff.	t-statistics
Profitability	0.029	0.022	0.007	7.501***
Bank size	9.425	9.985	-0.560	-6.925***
Equity capital	0.095	0.094	0.001	0.579
Charter value	0.650	0.785	-0.135	-6.010***
Non-interest income	0.016	0.020	-0.004	-4.885***
Deposits	0.693	0.710	-0.017	-2.818***
Volatility	0.083	0.095	-0.012	-4.047***
Retained earnings	0.049	0.042	0.007	3.356***
Macroeconomic conditions	93.294	96.962	-3.668	-7.270***

Note: Table 3 represents mean differences of the variables used in the paper. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

b. Results of the Empirical Model

This study investigates the impact of the existence of CRO on performance for a sample of banks that is described in detail above. The primary variable is the existence of CRO, control variables are mentioned in Section 3 above, year effects are controlled by including year fixed effects into the model. Because the presence of a CRO is relatively constant over time we do not include bank level fixed effects since it is problematic due to multicollinearity problem

Panel data analysis is employed in this study since this methodology combines time series and cross-sectional observations; thus, enabling data variability, enhanced informativeness, and higher degrees of freedom. Therefore, the applied model is considered to be superior to the models that only utilize one of those dimensions. Additionally, this methodology controls for heterogeneity, whereas time-series and cross-sectional analysis can come up with biased results in the case of heterogeneity (Baltagi, 2001). Additionally, problem of multi-collinearity is also reduced (Wooldridge, 2002).

In order to determine the estimator to be applied for model, numerous tests are run. Firstly, the existence of multicollinearity is checked and, no problem is detected among the selected variables. Secondly, to determine whether there is any unit effect or not; Likelihood-Ratio and F tests are run. According to the results, the model is found to have unit effects. Thirdly, to examine whether there is any time effect or not; F and LM tests are run and the model is found to have time effects. Accordingly, these results show that the model is not classical. To understand whether the model has fixed effect or random effects; Hausman test is run, the results of which can be found in Appendix 2. As the value of prob >chi2 is 0.000, H_0 stating that the difference between parameters is not systematic is rejected and the model is determined to be a two ways fixed effect model. After that heteroskedasticity test is conducted and the results are found to demonstrate the presence of heteroskedasticity. Then, in order to test for autocorrelation; Modified Bhargava et al. Durbin-Watson and Baltagi-Wu LBI Tests are run, and the model is found to be free from autocorrelation (Tatoglu, 2021).

Table 4 represents the regression results. According to the regression results, no significant relationship is detected between hired CRO in the bank and bank profitability. Though the coefficient is found to be positive, it is not significant. The findings of this study are consistent with the results of Quon et al. (2012). According to this study, the assessed levels of economic or market risk exposure or consequences are not found to be related with firm performance. Another study, which finds an insignificant relationship, is that of Smithson and Simkins (2005) and their findings show that the evidence that risk management increases firm value is fairly limited.

According to the panel data analysis results, equity capital, charter value, non-interest income, deposits are found to have significant relationships with profitability with all demonstrating 1% level of significance. In this study, charter value is calculated as book to market value of equity so, as consistent with the formula, the sign is negative in line with the expectations and the result is consistent with findings of King et al. (2016). Volatility and retained earnings have significant relationships with profitability but the level of significance is 10% which is lower than the level of other significant variables. Considering R-squared result, the explanatory power of the model is 65%.

Table 4: The impact of CROs and Firm Profitability and Stock Return Volatility

Variables	Profitability	Volatility
CRO	0.032	0.002
	(0.76)	(1.02)
Bank size	-0.001	-0.005***
	(-0.07)	(-7.57)
Equity capital	9.504***	-0.417***
	(13.63)	(-12.69)
Charter value	-1.108***	0.062***
	(-16.64)	(21.58)
Non-interest income	32.615***	0.574***
	(24.03)	(9.20)
Deposits	0.553***	0.001
	(2.86)	(0.13)
Volatility	0.963*	
	(1.76)	
Retained earnings	1.092*	-0.135***
	(1.87)	(-4.96)
Macroeconomic conditions	-0.004	-0.001**
	(-0.90)	(-2.41)
Constant	1.953***	0.160***
	(3.85)	(6.99)
Observations	1,575	1,577
R-squared	0.646	0.628
Year FE	Yes	Yes

Note: The column 1 of the table 4 represents regression results of the model 1, examining existence of CRO impact on bank profitability. The column 2 presents the results of panel data regressions where dependent variable is volatility. In

both regressions, the main independent variable of interest is CRO Dummy that equals 1 for firms that announced CRO appointments, 0 for firms in the control sample. The control variables are described in Appendix 1. The model includes year fixed effects. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

After investigating the relationship between the presence of CRO and profitability, another panel data analysis is conducted to examine the relationship between CRO and another variable; namely, stock return volatility. As it is shown in the second column of Table 4, no significant relationship is detected between presence of CRO and volatility, though the sign of the coefficient is positive.

Also, the relationship between CRO and Bank size is investigated to observe whether CROs have any influence on bank size. Therefore, another regression is conducted and, the results are provided in Table 5 below. According to regression results, the existence of CRO has a positive relationship with Bank size at 1% level of significance. However, it is also important to note that this significant positive relation between the existence of CRO and bank size might be due to endogeneity.

Table 5: The Relationship between CRO and Bank Size

Variables	Bank Size
CRO	0.423***
	(5.96)
Equity capital	-10.378***
	(-8.98)
Charter value	0.654***
	(5.85)
Non-interest income	28.122***
	(12.80)
Deposits	-4.940***
	(-16.21)
Volatility	-6.594***
	(-7.20)
Retained earnings	2.836***
	(2.86)
Macroeconomic conditions	0.005
	(0.68)
Constant	11.704***
	(14.40)
Observations	1,575
R-squared	0.326
Year FE	Yes

Note: This table represents regression results of the model, examining the relationship between existence of CROs and banks' size. The main independent variable of interest is CRO Dummy that equals 1 for firms that announced CRO appointments, 0 for firms in the control sample. The control variables are described in Appendix 1. The model includes year fixed effects. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels.

5. Conclusion and Discussion

This study is conducted by utilizing the Compustat database, specifically focusing on North American banks. The paper examines whether the existence of CRO affects bank's profitability or not. According to regression results, no significant relationship is detected between CRO and profitability. Although the relationship is positive as expected, it is not significant. As additional analyses, the relationship between existence of CRO and the banks' volatility is also checked. While initial univariate analysis in Table 3 provides some evidence of difference in terms of stock return volatility there is also no significant relationship between two variables in our panel data analysis. The relationship between existence of CRO and bank size is also checked. According to regression results, existence of CRO is found to be positively and significantly related with bank size at 1% level of significance.

Our study's findings align closely with those of Lundqvist S. and Vilhelmsson A. from their 2018 investigation into the relationship between Enterprise Risk Management (ERM) implementation and default risk in a dataset of 78 major global banks. They concluded that ERM implementation does not significantly influence credit ratings, which are indicative of default risk and financial ratios. Similarly, our results resonate with those of Pagach D. and Warr R.'s 2010 study on 106 U.S. firms, predominantly financial, that announce hiring a CRO. According to their findings, while they observed a decrease in earnings volatility in some firms with a CRO, their overall findings showed minimal impact of a CRO's presence on a broad range of firm variables. These results are similar to ours and underscore the consistency and relevance of our study's outcomes in the context of existing research.

It is possible that the observed significant and positive correlation between the presence of a Chief Risk Officer (CRO) and the size of a bank could stem from endogeneity. In other words, it might be that larger banks tend to appoint more CROs due to their size, rather than the presence of a CRO directly contributing to the bank's larger size. Distinguishing between these two scenarios necessitates further robustness tests, which are beyond the scope of this study and are suggested as a direction for future research.

References

Adams, R. B. and Mehran, H. (2012). Bank board structure and performance: evidence for large bank holding companies. *Journal of Financial Intermediation,* 21 (2): 243–267.

Banham, R. (2005). Enterprising Views of Risk Management. *Articles of Merit Award Program for Distinguished Contribution to Management Accounting,* August: 14–21.

Bailey, C. (2019). The Relationship Between Chief Risk Officer Expertise, ERM Quality, and Firm Performance. *Journal of Accounting, Auditing & Finance* , 37(1): 1-25.

Baltagi, B. H. (2001). *Econometric analysis of panel data*. (2nd ed.). United Kingdom.

Colquitt, L. L., Hoyt, R. E. and Lee, R. B. (1999). Integrated Risk Management and The Role of Risk Manager. *Risk Management and Insurance Review,* 2(3): 43-61.

Cumming, C. M. and Hirtle, B. J. (2001). The Challenges of Risk Management in Diversified Financial Companies. *Economic Policy Review,* 7(1): 1-17.

Deloitte, (2008). *Perspectives on ERM and the Risk Intelligent Enterprise.* (http://www.ipai.pt/fotos/gca/ surveyerm_pt_1_123.333.8524.pdf).

Demirgüç-Kunt, A., Detragiache, E. and Merrouche, O. (2013). Bank capital: lessons from the financial crisis. *Journal of Money Credit and Banking,* 45 (6): 1147–1164.

Demirgüç-Kunt, A. and Huizinga, H. (2010). Bank activity and funding strategies: the impact on risk and returns. *Journal of Financial and Economics,* 98 (3): 626–650.

Pagach, D. and Warr, R. (2010). The Effects of Enterprise Risk Management on Firm Performance, *Social Sciences Research Network.* Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1155218.

Pagach, D. and Warr, R. (2011). The Characteristics of Firms That Hire Chief Risk Officers. *The Journal of Risk and Insurance,* 78(1): 185-211.

Fahlenbrach, R. and Stulz, R. M. (2011). Bank CEO incentives and the credit crisis. *Journal of Financial Economics,* 99(1): 11-26.

Hambrick, D. C. and Mason, P. A. (1984). Upper Echelons: The Organization as a Reflection of Its Top Managers. *The Academy of Management Review,* 9(2):193-206.

Mehran, H. (1995). Executive compensation structure, ownership, and firm performance. *Journal of Financial Economics*, 38(2):163-184.

Liebenberg, A. P. and Hoyt, R. E. (2003). The Determinants of Enterprise Risk Management: Evidence From the Appointment of Chief Risk Officers. *Risk Management and Insurance Review,* 6(1): 37-52.

King, T., Srivastav, A. and Williams, J. (2016). What's in an education? Implications of CEO education for bank performance. *Journal of Corporate Finance*, 37(1): 287-308.

Lam, J. (2001). The CRO Is Here to Stay. *Risk Management,* 48(4): 16-22.

Beasley, M., Pagach, D. and Warr, R. (2008). Information Conveyed in Hiring Announcements of Senior Executives Overseeing Enterprise-Wide Risk Management Processes. *Journal of Accounting, Auditing and Finance,* 23(3): 311-332.

Grace, M. F., Leverty, J. T., Phillips, R. D. and Shimpi, P. (2015). The Value of Investing in Enterprise Risk Management. *Journal of Risk and Insurance,* 82(2): 289-316.

Meulbroek, L. K. (2002). Integrated Risk Management for the Firm: A Senior Manager's Guide. *Journal of Applied Corporate Finance*, 14(4): 56-70.

Nocco, B.W. and Stulz, M. (2006). Enterprise risk management: theory and practice. *Journal of Applied Corporate Finance,* 18(4): 8-20.

Pernell, K., Jung, J. and Dobbin, F. (2017). The Hazards of Expert Control: Chief Risk Officers and Risky Derivatives. *American Social Review,* 82(3): 511–541.

Quon, T. K., Zegnal, D. and Maingot, M. (2012). Enterprise risk management and firm performance. *Procedia-Social and Behavioral Sciences*, 62: 263-267.

Baxter, R., Bedard, J. C., Hoitash, R. and Yezegel, A. (2013). Enterprise Risk Management Program Quality: Determinants, Value Relevance, and the Financial Crisis. *Contemporary Accounting Research,* 30(4): 1264-1295.

Smithson, C. and Simkins, B. J. (2005). Does risk management add value? A survey of the evidence. *Journal of Applied Corporate Finance,* 17(3): 8-17.

Sterngold, J. (2014). After Crisis, Risk Officers Gain More Clout at Banks, *Wall Street Journal,* June.

Lundqvist, S., A. and Vilhelmsson, A. (2018). Enterprise Risk Management and Default Risk: Evidence from the Banking Industry. *Journal of Risk and Insurance,* 85(1): 127-157.

Tatoglu, F. (2021). *Panel Veri Ekonometrisi-Stata Uygulamali,* Istanbul: Beta Press.

Westman, H. (2011). The impact of management and board ownership on profitability in banks with different strategy. *Journal of Banking and Finance*, 35(12): 3300-3318.

Williamson, O. (1967). Hierarchical control and optimum firm size. *Journal of Political Economy,* 75(2): 123-138.

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. London: The MIT Press.

https://www.philadelphiafed.org/surveys-and-data/regional-economic-analysis/state-coincident-indexes

Appendix 1

Definition of Variables;

CRO (Chief Risk Officer): Dummy that equals one for firms that announced CRO appointments, 0 for firms in the control sample (Execucomp database).

Bank Size: The natural log of total assets (Compustat North America database).

Equity Capital: A ratio of total equity-to-assets (Compustat North America database).

Charter Value: Book-to-market value of equity (Compustat North America database).

Deposits: A ratio of customer deposits-to-assets (Compustat-Bank database).

Volatility: The standard deviation of monthly stock returns (CRSP database).

Non-interest Income: The ratio of non-interest income-to-total assets (Compustat-Bank database).

Retained Earnings: The ratio of retained earnings to assets (Compustat North America database).

Macroeconomic Conditions: Coincident Index for each state where a bank is headquartered as provided by Federal Reserve Bank of Philadelphia (Federal Reserve of Philadelphia website).

Appendix 2

	fe	re	Difference	S.E.
CRO	-0.063	0.001	-0.065	0.043
Bank size	-0.180	0.029	-0.209	0.060
Equity capital	14.575	10.991	3.584	0.837
Charter value	-1.059	-1.131	0.071	0.031
Non-interest income	33.969	36.228	-2.259	2.518
Deposits	1.017	1.073	-0.055	0.262
Volatility	-1.828	-0.902	-0.926	0.167
Retained earnings	-10.092	-2.230	-7.862	0.796
Coincident index	-0.021	-0.027	0.005	0.002

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$chi2(9) = (b-B)'[(V\_b-V\_B)^{\wedge}(-1)](b-B)$

= 154.04

Prob>chi2 = 0.0000

RESEARCH ARTICLE

THE IMPACT OF MICROFINANCE ON WOMEN'S EMPOWERMENT: A CASE STUDY OF MAZAR-I-SHARIF, BALKH, AFGHANISTAN

Baqir KHAWARI[*] iD
Mohammad Samim MISKINYAR[**] iD
Mohammad Sadiq KHAWARI[***] iD

Abstract

The purpose of this study is to assess the effect of microfinance on the empowerment of women in Afghanistan in terms of economic, educational, decision-making, and social status. The country has been plagued by poverty and conflict for more than 30 years, with women being the most severely impacted. Microfinance institutions have been introduced to alleviate poverty, with a focus on women. A quantitative research method was used, with 100 randomly selected women clients of Microcredit. The study found that microfinance has had a significant impact on women's economic empowerment, education, decision-making, and social status. However, access to microfinance services was challenging due to the need for a guarantor. Furthermore, the regression analysis showed that microfinance's economic empowerment, education, decision-making, and social status have a positive and significant impact on women's empowerment in Afghanistan. However, under the new regime, Microcredit is no longer available for women, which could have a significant impact on their empowerment, given the high poverty rate, particularly among women. Therefore, the study recommends that the government allow and encourage microfinance institutions to provide credit facilities to women in these challenging circumstances.

Keywords: Micro-finance, Women Empowerment, Mazar-i-Sharif, Afghanistan
Jel Code: G2, G21, J16

1. Introduction

By the year 2000, Afghanistan held the unfortunate distinction of being the nation with the largest refugee population globally, the highest mortality rate, and the highest production of opium. Within the country, over half of its population remained largely unseen and received negligible attention in terms of social, political, and economic matters. This situation, as highlighted by Nemat (2011), rendered them practically invisible and marginalized within Afghan Society. Since

---

[*]   Samangan University, Aybak, Afghanistan. Email: baqirkhawari1991@gmail.com, ORCID: 0000-0001-5142-4784

[**]   Samangan University, Aybak, Afghanistan. Email: miskinyarm@gmail.com, ORCID: 0009-0006-8011-3081

[***] Mazar-i-Sharif, Afghanistan. Email: m.sadeqkhawari1996@gmail.com, ORCID: 0009-0003-6096-6245

1996, Afghanistan has undergone significant political upheavals and transformations. The Taliban, an extremist Islamist group, seized control of the country in 1996, imposing a strict interpretation of Islamic law. Their rule resulted in repressive policies, particularly affecting women's rights and cultural freedoms. In 2001, following the 9/11 attacks, the United States intervened, ousting the Taliban regime, and initiating a period of reconstruction and democratization. Subsequent years saw the establishment of a fragile democratic government, but the security situation remained precarious due to persistent insurgencies. Fast-forwarding to 2021, the U.S. announced its withdrawal, leading to the rapid takeover of Afghanistan by the Taliban once again on 15 August 2021, marking a turbulent chapter in the country's political history. The international community closely monitored the situation, grappling with the implications of this power shift and the future of Afghan governance.

Furthermore, in terms of gender inequality, Afghanistan grapples with severe gender inequality, as reflected in its Global Gender Inequality Index (GII) values over the years. In 2015, the GII stood at 0.706, indicating notable gender disparities. By 2019, although a slight improvement was noted with a reduction to 0.665, the situation worsened in 2021, with the index rising to 0.678 (UNDP, 2021). Alarming findings from the Global Gender Gap Report (2023) by the World Economic Forum (WEF, 2023) underscore Afghanistan's persistent struggle for gender equality. The nation consistently ranks at the bottom among 146 countries, earning the unfortunate distinction of being the world's worst country in gender equality in 2021 and 2022. Despite a marginal increase in the GII in 2021, Afghanistan's gender equality score remains distressingly low at 40.5%, securing its place at the bottom of the distribution, 149. The Taliban's assumption of control in August 2021 exacerbated the situation, as they imposed orders curtailing women's rights and freedoms, further entrenching gender inequality within Afghan Society

Furthermore, according to a 2011 survey by the Thomson Foundation it is released that one of the most dangerous places for women is Afghanistan (Luccaro & Gaston, 2014). Women in certain parts of the world are facing significant dangers, such as high mortality rates, restricted access to medical care, education, and social and economic rights, as well as abuse and violence. According to the United Nations Development Fund for Women (UNIFEM), a shocking 87% of women in Afghanistan are subjected to abuse and violence (cited at Ullah, 2017). Furthermore, reports from Human Rights Watch (HRW) indicate that women in areas under Taliban control are constantly living in fear of threats, intimidation, and violence. The Taliban has targeted girls' schools, female political leaders, and activists, resulting in several murders (Khan & Zyck, 2012).

Besides, on the economic front, the National Risk and Vulnerability Assessment (NRVA) [1] reported that participation in women's labour force is much lower than men's, 47% and 86%, respectively (Khan & Zyck, 2012). In addition, based on the Afghanistan Living Conditions Survey, the active economic population includes 80% men and only 20% women; however, almost half

---

[1]   "National Risk and Vulnerability Assessment, which the Afghan government and the European Union conducted." Accessed February 2, 2024, https://www.ilo.org/surveyLib/index.php/catalog/7922/download/48989. Retrieved by Central Statistic Organization of Afghanistan.

of the country's population is women (Mariia et al., 2019). The Parliamentary Information and Research Service (PIRS) of the Canadian government reports that women need more support in their efforts to make a living, as they have restricted economic prospects and are predominantly confined to working within their households. PIRS notes that women's participation in the workforce is primarily restricted to occupations such as agriculture and animal husbandry. Also, it is presented that even if women generate income for their household, they have limited control over that (Khan & Zyck, 2012).

A considerable number of women in Afghanistan are experiencing poverty, with most falling into the category of "chronically poor" as defined by the Millennium Development Goals of Afghanistan report (MDGs, 2005). Available resources for these women only generate USD1 per person daily. This poverty is not limited to women who head households but is prevalent among most women in the country (Noor et al., 2008).

The literacy rate in Afghanistan is the lowest globally, with women being disproportionately affected. The gap can be attributed, in large part, to the six-year rule of the Taliban, during which girls' schools were closed (Campbell, 2017). Importantly, it is currently continuing in Afghanistan. As a result, according to UNISCO's reports, the adult literacy rate for females was 29.81% in 2018, which shows a meagre literacy rate compared to other countries (Afghanistan-Literacy rate, 2018). For instance, the literacy rates for females in Spain, Italy, Greece, the United Arab Emirates, Armenia, Kazakhstan, and Malaysia are 97.97%, 98.97%, 97.39%, 95.10%, 99.68%, 99.5%, and 93.5%, respectively (Afghanistan-Literacy rate, 2018). Moreover, the literacy rate of Afghanistan in 2022 was 37.3% (22.6% for women and 52.1% for men) (UNESCO, 2023). Due to their limited literacy levels, Afghan women face significant challenges in securing formal employment, resulting in less than 20% of them being able to contribute to household income. Furthermore, Afghan men tend to invest more in their sons' education, even sending them abroad for higher education, while neglecting the education of their daughters. This is often due to gender bias, as Afghan men tend to view women as unlikely to become family breadwinners (Rahimi, 1991; Mashwani, 2017).

The United Nations has reported that millions of women and girls in Afghanistan are facing significant challenges due to the country's conservative culture, including child marriage and honour killings, with the government struggling to enforce laws against such practices (UN Women, 2013). The Ministry of Women's Affairs in 2018, as cited in Mariia et al. (2019), has stated that 60-80% of all marriages in Afghanistan are forced, and 57% of brides are under the age of 16, leading to early childbearing and maternal deaths. According to Taylor and Pereznieto (2014), microfinance is seen "as a way to empower women, not only by giving them greater access to resources but also by increasing their ability to control those resources. This can lead to economic empowerment for women, where they have equal access to and control over economic resources, thereby increasing their control over other areas of their lives. However, microfinance faces various challenges, including religious obstacles related to the Islamic prohibition on paying and receiving interest. Nichols (2010) stated that some microfinance institutions tried

to overcome this challenge by renaming interest fees as service and administrative fees. The impact of microfinance on women's empowerment, especially in terms of Microcredit, savings, and insurance products, is still uncertain. According to Ashraf et al. (2010), many studies on this issue may be biased in selecting females who have access to microfinance.

Moreover, cultural and socioeconomic factors, as well as attitudes towards loans, can affect the impact of microfinance on women's empowerment, resulting in variations from one region to another. Numerous studies have highlighted the importance of considering the social and cultural context when assessing the impact of microfinance on women's empowerment (Kabeer, 2001; Mayoux, 2000; Rahman, 1999). These studies have shown that the effectiveness of microfinance interventions varies greatly depending on local conditions, including cultural norms, socioeconomic factors, and institutional arrangements. Therefore, a one-size-fits-all approach to microfinance may not be appropriate. Several studies have shown varying results in the impact of microcredit on women's empowerment in different regions. For instance, studies conducted in Sub-Saharan Africa have shown both positive and negative impacts or no impact at all (Awojobi, 2014; Bercaw, 2012). However, there is a lack of empirical studies focusing on the impact of microfinance programs on women's empowerment in Afghanistan. Therefore, this research aims to examine the economic and social empowerment of women through microfinance in Balkh province, Afghanistan.

The study will also assess the accessibility of microfinance services, as borrowers face challenges such as unavailability and limited access to loans. Furthermore, borrowers' understanding of the credit structure and its nature will also be evaluated (Saeed & Akshay, 2008). Although most studies on women's empowerment through microfinance focus on rural areas, a study conducted in an urban area of Malaysia has shown that microfinance can also empower women in urban areas (Al-Shami et al., 2016). However, this study targets all women regardless of their marital status and location.

The history of banking in Afghanistan reflects the impact of decades of war, leading to the collapse of the formal banking system. Currently, microfinance services are provided by formal institutions like banks, semiformal entities like NGOs, and informal sources such as moneylenders. Imported microfinance models dominate, with a focus on group lending and solidarity groups. Individual lending, involving credit provision to individuals outside a group, is utilized by both banks and microfinance institutions (MFIs) in Afghanistan. Individual loan sizes range from $120 to $6000, with a client's credit history and relationship with the lending institution determining access to larger loans. Group lending methodologies involve forming small groups that act as guarantors for each other's loans, promoting peer pressure as collateral. The Village Banking approach, community-managed savings, and loan associations, faces limitations based on community savings capacity. Credit unions, introduced with USAID and MISFA funding, follow Islamic banking principles. Some organizations have experimented with Self Help Groups, Seed Banks, and integrated development programs to address specific social needs. Individual lending is

considered the most desirable, but challenges include weak infrastructure and administration costs for reaching rural clients (Hussein, 2009).

Although surveys have been carried out in Afghanistan to evaluate the impact of microfinance on women's lives and gender mainstreaming, no scholarly investigation has yet been undertaken on the subject of women's empowerment through microfinance in the country. These surveys, such as those conducted by Sengupta and Aubuchon (2008) and on gender mainstreaming in Afghanistan's microfinance sector, did not specifically focus on how microfinance empowered women in Afghanistan. However, given the critical role that women play in the economic development of any country, empowering women can have significant impacts on the country's overall economic growth and development. International institutions like the World Bank have recognized the empowerment of women as a crucial factor in achieving economic development. Thus, it is essential to know the impact of microfinance on women's empowerment by doing the field research.

Moreover, according to the Executive Director of the United Nations Development Fund for Women, Microcredit is about much more than access to money. It is about women gaining control over the means to make a living. It is about women lifting themselves out of poverty and vulnerability. It is about women achieving economic and political empowerment within their homes, their villages, their countries (Colaco & Rangamani, 2013: 1).

This research aims to address the gap in academic research on the impact of microfinance on women's empowerment in Afghanistan, particularly in the city of Mazar-i-Sharif, Balkh province. By examining the micro-credit program's effects, the study intends to contribute to the existing literature and evidence on the topic. The primary objective is to analyze how microfinance programs impact women's empowerment in the region. Also, the study will answer the question, what is the relationship between microfinance and women's empowerment? What are the obstacles that women encounter when trying to gain access to microfinance programs?

2. Literature Review

Microfinance institutions (MFIs) in Afghanistan prioritize serving female clients, recognizing them as the most economically vulnerable due to limited access to productive assets. Hussein (2009) emphasizes this focus, aligning with Central Statistics Organization (2018) data highlighting women as a critical demographic in poverty. Haidari's (2018) research, utilizing primary data and regression analysis, reveals that women participating in microfinance contribute more to household income than non-participants. Nazari's (2016) field survey confirms the positive impact of microfinance credit on clients' earnings in Afghanistan.

There is a need for more research in this field in Afghanistan, so to complete this section, we are looking at other studies in countries that have situations similar to Afghanistan's. Several studies conducted in Pakistan have investigated the impact of microcredit on women's empowerment.

Khan (2012) study for District Bahawalpur focused on identifying socioeconomic factors influencing women's empowerment among microcredit recipients between 2002-2009. Utilizing multiple linear regression analysis, the study found that factors such as the woman's age, husband's education level, inherited assets, marital status, number of living sons, and microfinance amount received significantly influenced women's empowerment, with microfinance showing a positive effect. Fayyaz et al. (2016) also explored Bahawalpur, using a logit model on 400 samples, revealing that microcredit programs positively impact household income and enhance the quality of life in underdeveloped regions. Sulaiman (2012) study, employing the Johansen co-integration approach, established a long-term relationship between poverty, economic growth, microfinance, and women's empowerment in Pakistan, with positive and significant correlations. In the context of India, Garikipati (2008), Modi et al. (2014), and Lavoori & Paramanik (2014) collectively investigated the effects of microfinance services, particularly microcredit, on women's empowerment. Garikipati (2008) found that women's income and assets were positively impacted, supporting the conclusion of Modi et al. (2014) such that microfinance services empower women in both family and society. Lavoori & Paramanik (2014) highlighted the positive influence of husband's income, family size, and self-help group meetings on women's empowerment through microcredit, based on logit model analysis.

Several studies have investigated the relationship between women's empowerment and microcredit programs in various regions. Akhter and Cheng (2020) conducted research in Bangladesh, employing logistic regression analysis, and found that participation in microcredit positively impacts women's decision-making abilities, legal awareness, independent movements, mobility, and living standards. Debnath et al. (2019) focused on microcredit accessibility in rural Bangladesh, revealing that participation enhances women's control over savings and decision-making power within households. Pitt et al. (2006) demonstrated, using the ordinary least squares method, that microcredit contributes to overall women's empowerment. In Tanzania, Kirigiti Josephat et al. (2017) found that microfinance institutions positively impact economic, interpersonal, and familial empowerment, but not legal and political empowerment. Kato and Kratzer (2013) observed increased empowerment among MFI members, including control over savings, decision-making participation, self-efficacy, self-esteem, and enhanced mobility. Chhay (2011) reported positive economic effects of microfinance programs in Cambodia. In Yemen, Alshebami & Khandare (2015) highlighted the challenges women face in accessing microfinance but noted positive impacts for those who participate. Mulugeta & Gutu (2016) found positive effects on empowerment indicators in Ethiopia. Addai (2017) studied microfinance services in Ghana, revealing positive relationships with economic and social empowerment, influenced by marital status, education level, and age, while high-interest rates posed challenges.

Phuoc & Nguyen (2018) utilized logistic regression to analyze data from 544 women in Vietnam, revealing that microfinance members demonstrated higher empowerment levels in economic security, household decision-making, and community involvement compared to non-members. Corsi et al. (2006) emphasized the transformative impact of accessing credit, enabling financial independence, and lifting women out of poverty. Mudaliar and Mathur (2015)

observed significant empowerment effects of microfinance, supported by Ganle et al. (2015), although acknowledging variations in its impact. Al-Mamun et al. (2014) focused on Amanah Ikhtiar Malaysia's microcredit program, finding positive effects on urban low-income women's empowerment. Al-Shami et al. (2016, 2017) supported these findings, noting enhanced gender equality, increased income, decision-making power, and self-esteem. Additionally, Islamic microfinance, as highlighted by the Islamic Development Bank (2020), can empower women in business by addressing their unique needs and roles, emphasizing the importance of a nuanced and inclusive approach for effective support in entrepreneurship and overall well-being.

Zulfiqar and Tabasum (2023) conducted interviews with fifty female borrowers engaged in income-generating activities, revealing that utilizing Islamic microfinance positively impacted women's ability to allocate funds for household needs, health, and education. However, it noted no significant influence on mobility and awareness, emphasizing that credit access alone is insufficient for empowerment without concurrent rights awareness. Khan et al. (2023) found a positively significant but moderate effect of microfinance on economic, political, and psychological aspects of women's empowerment, with a minor overall impact on social empowerment. Bawah et al. (2023) highlighted the significant assistance of microfinance schemes in the Sagnarigu Municipality for very low-income families, providing protection against risks and supporting women in decision-making. Gubhaju (2023) demonstrated positive effects of microfinance in Rautahat district, including increased income, savings, asset ownership, participation in household financial decisions, and enhanced mobility confidence. Collectively, these studies underscore the multifaceted impact of microfinance on various dimensions of women's empowerment. Numerous research endeavours (Mannah-Blankson, 2018; Addae-Korankye & Abada, 2017; Gupta, 2020; Batinge & Jenkins, 2021) indicate that microfinance institutions contribute to women's empowerment, fostering gender equity and enhancing household welfare through economic engagement. Alshebami's 2015 study emphasized prioritizing women's access to microfinance services worldwide, advocating for poverty alleviation, increased efficiency, sustainability and equality in empowerment. Chaudhary (2022) further supported the significant empowerment impact of microcredit initiatives on impoverished women, influencing family affairs, decision-making, self-confidence, and overall well-being

3. Theoretical Framework

Figure 1 shows the theoretical framework of the subject. It illustrates how the independent variables, economic improvement of women, education enhancement of women, and family and personal life decision making and social status of women through microfinance, may affect our dependent variable, women empowerment. It means that there is a direct relationship between the independent and dependent variables. The relationship is supported by Zulfiqar and Tabasum (2023), Khan et al. (2023), and Bawah et al. (2023).
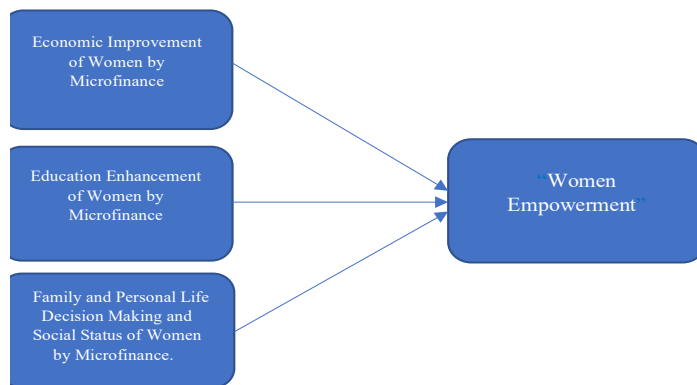
Figure 1: Theoretical Framework of Women's Empowerment

4. Data Collection and Sampling Method

This study, conducted in November 2020, utilized structured questionnaires to explore the topic of women's empowerment through microfinance in Afghanistan. The questionnaire, designed based on prior studies by Idrees et al. (2012) and Granlund (2013), aimed to measure empowerment. Participants were selected using a simple random sampling method from a program participant list. This approach ensures unbiased representation, as each individual has an equal chance of inclusion, aligning with recommendations from LoBiondo-Wood and Haber (1994) for comprehensive population coverage and Brink and Wood (1998) for obtaining a more representative sample. The advantage lies in unbiased representation, though there is a potential disadvantage of not fully capturing specific subgroups due to chance. This method enhances generalizability, reflecting how well the sample represents the entire population.

4.1. Sample Size and Population

The aim of this study was to evaluate the impact of microfinance on women's economic empowerment, education enhancement, family, and personal life decision-making, and the accessibility of microfinance services. The target population consisted of female clients of microfinance institutions who had borrowed money for various purposes in the past or were currently receiving loans. The study randomly selected 100 women from the list of microfinance clients in Mazar-i-Sharif City, the capital of Balkh province. The city was chosen based on its convenient location, availability of sources, and reliable respondents. The data collected from the selected women were used to examine the research objectives.

4.2. Data Analysis Method

In this research, some statistical analysis and procedures such as normality test, reliability test, descriptive analysis, correlation tests, and multiple linear regression were applied to achieve the objective of the study. The equation for multiple linear regression is as follows.

$$WE = \beta_0 + \beta_1 EE + \beta_2 EDU + \beta_3 DMSS + u$$

where WE stands for women empowerment, which is our dependent variable, EE stands for economic empowerment of women, EDU stands for education enhancement of women, and DMSS stands for decision making and social status of women.

4.3. Normality Test

Various methods can be used to assess the normality of data. According to Doane and Seward (2011), normality can be determined by analysing kurtosis and skewness values. However, Pallant and Lae (2002) suggest that normal distribution can also be identified using histogram and Q-Q plots. For this research, the first method was used to analyze normality. Tiago (2021) explains that Kline (2011) suggests that data with a skewness value less than 3 and a kurtosis value lower than 10 are considered normally distributed. Therefore, the data for this research are customarily distributed based on the analysis of its kurtosis and skewness values. Table 1 presents the results of the descriptive analysis, including mean, skewness, kurtosis, and standard error.

Table 1: Normality Test

No	Items	Mean	Standard deviation	Skewness	Kurtosis	Standard error
	Economic Empowerment of Women					
1	"More women have established businesses through MFIs	3.82	1.066	-1.258	1.051	.242
2	Creating work opportunities for other women	3.67	1.139	-.788	.123	.251
3	Using MFIs has increased women's property possession	3.72	0.932	-.761	.835	.243
4	I have experienced growth in business through MFI services	3.18	1.283	-.268	-.944	.243
5	Contribution to household income has increased	3.74	1.144	.335	-2.251	.598
6	I am confident in managing a financial crisis	3.54	1.078	-.463	-.378	.242
7	I can purchase any household assets (TV, Fridge, Mobile, Furniture)	3.46	1.278	-.528	-.804	.243
	Education Enhancement of Women					
1	Participating in microfinance helped me to improve my reading skills	3.43	1.402	-.472	-1.075	.242

2	Participating in microfinance helped me to improve my writing skills	3.21	1.416	-.239	-1.313	.242
3	Girls' schooling expenses are manageable	3.9	1.243	-1.031	.017	.242
4	I can decide which school to send the girls	4.21	0.977	.375	-2.801	.795
5	I can pursue my higher education	3.82	1.366	-1.198	-.085	.242
6	Improved my knowledge and skills for my own work/ business	3.54	1.141	-.643	-.104	.242
7	Participation in Microfinance improves the level of education (children's education)	3.56	1.008	-.832	.625	.241
	Microcredit Accessibility					
1	Credit facilities are easily accessible in MFIs	3.65	1.038	-.671	-1.848	.598
2	The savings I make with MFIs are flexible with my income	3.39	0.984	-.272	-.065	.242
3	Training provided by microfinance is beneficial	3.94	0.993	-1.079	1.005	.242
4	Interest rates offered by MFIs are suitable for me	3.55	0.978	-.573	-.022	.242
5	Credit requirements of MFIs can be negotiated	3.59	1.055	-.692	.064	.242
6	The size of available credit suits my needs	3.59	1.045	-.849	.399	.242
7	Guarantee of loans and credit is manageable	2.9	1.219	-.020	-.901	.242
	Family and Personal Life Decision Making					
1	I can take challenges and believe in myself	4.33	0.815	-2.001	4.001	1.024
2	I receive respect in the neighborhood	4	1.094	-1.478	1.525	.242
3	I have earned the respect of my family and Society after joining MFIs	3.94	1.062	-.888	.264	.242
4	I can decide what type of Birth Control Methods to use	3.77	1.129	-1.003	.495	.242
5	I am involved in girl's Marriage Decision	4	1.129	-1.236	1.049	.242
6	I can make decisions about Children's life	4.07	1.038	-1.444	2.163	.242
7	I have encouraged other women in Society since joining MFIs	3.85	1.048	-1.139	1.089	.242
	Empowerment of Women					
1	By using microfinance services, I am confident in managing any financial difficulties	4.13	0.693	-.178	-.889	.242
2	Participating in micro-finance improved my social status	3.92	1.042	-.934	.414	.242
3	My reading and writing skills improved after joining Microfinance	3.59	1.196	-.523	-.775	.242
4	Micro-finance services enhanced my autonomy	3.91	1.027	-.963	.557	.242
5	After participating in micro-finance, my opinion is much more valued in family decision making"	4.19	0.919	-.998	.202	.551

4.4. Reliability Test

Reliability refers to the consistency of an instrument's results. Wall and Byrd (2001) define reliability as the extent to which an instrument produces consistent and stable results when measuring the same variables across different time periods. The reliability of data is essential in ensuring the validity and accuracy of research findings, as reliable data is accessible from unstable and random errors (Blumberg et al., 2014). Cronbach's alpha is commonly used as an indicator of internal consistency, with a score above 0.7 indicating more excellent reliability. Ensuring the reliability of the data collection instruments is critical in order to strengthen the validity of the constructs being measured and to enhance the stability and credibility of the research results. A coefficient of 0.3-0.6 explains a moderate correlation, while a coefficient of 0.7 or more is considered vital.

The reliability of the data collected for the five variables "women economic empowerment, women education enhancement, accessibility of microfinance program, family and personal life decision making, and women's empowerment was assessed using Cronbach's alpha coefficient. The results presented in Table 2 demonstrate that all five variables have a Cronbach's alpha coefficient greater than 0.7, indicating that the data is reliable. A Cronbach's alpha coefficient greater than 0.7 is considered strong and provides higher stability to the results. These findings provide confidence that the data can be used for further analysis.

Table 2: Reliability Test

Indicators	Number of Items in each Segment	Cronbach's Alpha
Economic Empowerment of Women	7	0.815
Education Enhancement of Women	7	0.844
Microcredit Accessibility	7	0.805
Family and Personal Life Decision Making	7	0.824
Empowerment of Women	5	0.783

4.5. Descriptive Statistic Analysis

After confirming the reliability and normality of the data, descriptive analysis was conducted to provide an overview of the microfinance clients in the study. This involved using percentages and frequencies to describe their characteristics, as well as providing descriptive statistics for all variables included in the study, such as women's economic empowerment, education enhancement, accessibility of microfinance, family and personal life decision-making, and women's overall empowerment. The analysis was based on calculating the frequency, percentage, and mean values of the data.

4.5.1. Background of the Respondents

All 100 participants, which are selected from one microfinance bank, The First Microfinance Bank, in the study were female, as the focus was on women's empowerment through microfinance in Mazar-i-Sharif, Afghanistan. Table 3 represents some critical information about the background of the respondents in this study. First, in terms of the age of the respondents, the table indicates that the majority of the respondents fall within the age range of 18-25 with 45%, while the lowest percentage was found in the 55 and above age group, with only 3% of the respondents. In terms of marital status, the table displays that the highest percentage of respondents are single, accounting for 46 percent, followed by married at 42 percent. Only a tiny percentage of respondents, 5 percent, are divorced, while 7 percent are widowed.

Next, in terms of the education level of the respondents, the result shows that the largest group of participants, with 32 percent, have a bachelor's degree, followed by 31 respondents who are illiterate. Nine percent of the respondents hold a diploma, while another nine participants are literate. Nineteen percent of the respondents have a high school certificate. Finally, it is evident from the table that the majority of the participants, constituting 33 percent, are homemakers. The second largest group, comprising 21 percent, are students, while 18 percent are currently unemployed. Only 8 percent of the respondents identified as entrepreneurs, and 7 percent were self-employed. Finally, 13 percent of the participants reported having formal employment.

Table 3: Background of the Respondents

Indicators	%	Indicators	%
Age Group of Respondent		**Marital Status of Respondents**	
18-25	45	Single	46
26-35	26	Married	42
36-45	12	Widow	7
46-55	14	Divorced	5
55 and Above	3	Total	100
Total	100		
Education Level of Respondent	%	**Occupation of Respondents**	%
High School	19	Entrepreneur	8
Literate	9	Formally Employed	13
Illiterate	31	Housewife	33
Diploma	9	Unemployed	18
Bachelor Degree	32	Self-employed	7
Total	100	Student	21
		Total	100

Table 4 provides a descriptive analysis of the economic empowerment of micro-credit clients. The data was gathered from seven questions related to their economic status after receiving micro-finance loans. The mean values for each question were computed, and the average mean value

was found to be 3.59. The highest mean value was recorded for question one, more women have established businesses through MFIs, with a mean value of 3.82. It was observed that the majority of women who received micro-finance services agreed with this statement, with 50% responding agree and 25% responding strongly agree. However, the lowest mean value was recorded for question four. I have experienced growth in business through MFI services. It was noted that the respondents were uncertain about the growth of their businesses through microcredit support.

Moreover, the analysis reveals that the question with the second highest mean value is using MFIs has increased women's property possession, with a mean value of 3.72, indicating that 47 percent of micro-credit borrowers agreed with the statement. However, when it comes to the question of purchasing household assets such as a TV, fridge, mobile phone, or furniture, most of the respondents reported being unable to purchase any of these assets despite using MFIs.

The findings from Table 4 indicate that microfinance has a beneficial influence on women's economic empowerment. The mean value of 3.59 indicates that the respondents agreed that microfinance has positive effects, including starting a business, helping with household finances, and managing financial difficulties. For a breakdown of the mean value and frequency for each question, please refer to Table 4.

Table 4: Women's Economic Empowerment

Item	Statements	Level of Economic Empowerment					N	Mean	SD
		1	2	3	4	5			
1	More women have established businesses through MFIs	7	7	11	50	25	100	3.82	1.066
2	Creating work opportunities for other women	6	7	24	38	25	100	3.67	1.139
3	Using MFIs has increased women's property possession	4	6	26	47	17	100	3.72	0.932
4	I have experienced growth in business through MFI services	13	16	26	28	17	100	3.18	1.283
5	Contribution to household income has increased	8	7	13	49	23	100	3.74	1.144
6	I am confident in managing a financial crisis	5	12	26	38	19	100	3.54	1.078
7	I can purchase any household assets (TV, Fridge, Mobile, Furniture)	11	12	21	30	26	100	3.46	1.278
	Mean							3.59	
Note: 1=Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly agree"									

4.5.2. Education Enhancement of Women

Table 5 presents the results of the survey conducted to determine the impact of microfinance on women's education. Seven questions were asked, and the mean values recorded were between 4.21 and 3.21. Question four, which is I can decide which school to send the girls to, has the highest mean value, followed by question three, "Girls' schooling expenses are manageable." The

responses indicate that women are now able to decide on their daughters' education and manage their schooling expenses after participating in the microfinance program.

Furthermore, according to the survey results presented in Table 5, women had a neutral response to the statement that participating in microfinance improves their writing skills. However, a majority of women agreed that microfinance programs help to improve their reading skills, which indicates a positive impact on their literacy levels. The mean value of 3.667 for this variable suggests that microfinance programs can have a positive impact on the education of women and girls. More detailed information about the frequency and percentage of responses for each statement can be found in Table 5.

Table 5: Women's Education Enhancement

Item	Statements	Level of Women's Education Enhancement					N	Mean	SD
		1	2	3	4	5			
1	"Participating in microfinance helped me to improve my reading skills.	13	15	17	26	29	100	3.43	1.402
2	Participating in microfinance helped me to improve my writing skills.	16	21	13	26	24	100	3.21	1.416
3	Girl's schooling expenses are manageable	8	9	10	31	42	100	3.9	1.243
4	I can decide which school to send the girls	4	4	5	43	44	100	4.21	0.977
5	I can pursue my higher education	12	8	5	36	39	100	3.82	1.366
6	Improved my knowledge and skills for my own work/ business	8	8	28	34	22	100	3.54	1.141
7	Participation in Microfinance improves the level of education (children's education)	5	7	28	45	15	100	3.56	1.008
	Mean							3.667	
"Note: 1=Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly agree"									

4.5.3. Decision Making and Social Status

The survey inquired about the effect of micro-finance on the personal and family decision-making and social status of clients through seven questions. The descriptive analysis of mean values for these questions is presented in Table 6, where the range is between 3.77 to 4.33. The question with the highest mean value is number one, which is I can take challenges and believe in myself with a mean value of 4.33. This indicates that participating in micro-finance programs can boost women's confidence in tackling challenges and believing in themselves. The statement with the second highest mean value is number six, which is I can make decisions over children's lives, with a mean value of 4.07. It shows that women gain the ability to make decisions regarding their children's future through participating in micro-finance programs.

Moreover, 44 percent of the borrowers agreed, and 37 percent strongly agreed with statement number two, which is I receive respect in the neighbourhood and had a mean value of 4.0. This

implies that women who join micro-finance programs are respected in their neighbourhoods. Similarly, statement number five, I am involved in girl's marriage decision, also had a mean value of 4.0, indicating that women can participate in the decision-making process for their daughters' marriage after participating in micro-finance programs. Therefore, these results demonstrate that micro-finance programs have a positive impact on the decision-making abilities of women and their social status in their communities.

Based on the responses to statement number three, which asked if the clients had gained respect from their families and Society after joining MFIs, it was reported that 34 percent of the respondents agreed, and 37 percent strongly agreed with the statement. These results suggest that participating in micro-credit programs has a positive impact on women's confidence and decision-making abilities, as well as their social status within their families and communities.

Thus, the survey's results revealed that women who have taken microfinance loans have experienced significant improvements in their personal and family life decision-making abilities, as well as their social status. This is demonstrated by the average mean value of 3.99, which indicates a strong positive impact of microfinance on the lives of women. In summary, participating in microfinance programs has been shown to be highly beneficial for women, resulting in significant improvements in their decision-making abilities and social status.

Table 6: Family Decision-Making and Social Status

Item	Statements	Level of Family Decision-Making & Social Status					N	Mean	SD
		1	2	3	4	5			
1	I can take challenges and believe in myself	1	4	5	41	49	100	4.33	0.815
2	I receive respect in the neighbourhood	5	6	8	44	37	100	4	1.094
3	I have earned the respect of my family and Society after joining MFIs	4	6	19	34	37	100	3.94	1.062
4	I can decide what type of birth control methods to use	8	5	16	44	27	100	3.77	1.129
5	I am involved in girl's marriage decision	5	5	14	35	41	100	4	1.129
6	I can make decisions about children's lives	4	3	13	42	38	100	4.07	1.038
7	I encourage other women in Society since joining MFIs	6	5	13	48	28	100	3.85	1.048
	Mean							3.99	
Note: 1=Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly agree"									

4.5.4. Accessibility of Microfinance Services

To evaluate the accessibility of "microfinance services among borrowers," the survey posed seven questions, and the results are displayed in Table 7. The mean values ranged from 3.94 to 2.90, indicating that respondents generally agreed with the statements. Most respondents found the training provided by microfinance institutions to be beneficial, with 46% agreeing and 31% strongly agreeing, resulting in a mean value of 3.94. Additionally, almost two-thirds of

respondents (47% agreed, 19% strongly agreed) found credit facilities to be easily accessible in MFIs. This indicates that women have a straightforward path to obtaining micro-credit facilities. Moreover, the majority of respondents (45% agreed, 18% strongly agreed) reported that the size of the available credit met their needs. This suggests that the size of the micro-credit loans is suitable for the needs of the women.

The survey results showed that women found it challenging to manage the requirement of a guarantor or collateral, as evidenced by the low mean value of 2.90 for statement number seven. However, despite this challenge, the overall mean value of 3.516 suggests that microfinance services remain accessible to women. This indicates that despite the difficulty in finding a guarantor, women are still able to access microfinance loans and benefit from the services offered.

Table 7: Accessibility of Microfinance Services

Item	Statements	Accessibility of Microfinance Services					N	Mean	SD
		1	2	3	4	5			
1	More women have established businesses through MFIs	4	10	20	47	19	100	3.65	1.038
2	Creating work opportunities for other women	4	12	39	31	14	100	3.39	0.984
3	Using MFIs has increased women's property possession	3	7	13	46	31	100	3.94	0.993
4	I have experienced growth in business through MFI services	4	11	26	44	15	100	3.55	0.978
5	Contribution to household income has increased	7	10	22	42	19	100	3.59	1.055
6	"I am confident in managing the financial crisis	6	8	23	45	18	100	3.59	1.045
7	I can purchase any household assets (TV, Fridge, Mobile, Furniture)."	15	22	30	24	9	100	2.9	1.219
	Mean							3.52	
"Note: 1=Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly agree"									

4.5.5. Women Empowerment

The survey included five questions to assess the level of women's empowerment through microfinance. Table 8 shows that the mean values range from 3.59 to 4.19. The highest mean value (4.19) was recorded for the statement, "After participating in microfinance, my opinion is much more valued in family decision-making." This indicates that most women who have taken microfinance loans are empowered in their families, and their opinions are considered in decision-making. The study's findings on the positive impact of microfinance on women's decision-making abilities are in line with previous research conducted by Nehad (2017) and Kabeer (2001), which indicated that women's income generation plays a significant role in family decision-making. The second highest mean value (4.13) was recorded for the statement, by using microfinance services, I am confident in managing any financial difficulties, indicating that microfinance services have enabled women to become financially empowered, independent,

and capable of managing financial challenges. This finding is consistent with earlier studies by Kabeer (2001) and Addai (2017), which showed that microfinance services can empower women economically, enhance their financial status, and increase their purchasing power.

One of the questions in the questionnaire was related to the improvement of reading and writing skills after joining the microfinance program.The mean value for this statement was 3.6, indicating that a significant proportion of the borrowers believed that their reading and writing skills improved after participating in the micro-credit program. Expressly, 60 percent of the respondents agreed with this statement, while only 22 percent disagreed.

The second statement in the questionnaire, participating in micro-finance improved my social status, had a mean value of 3.92, indicating that female borrowers experience an improvement in their social status after receiving micro-credit loans, which results in tremendous respect from Society. Similarly, the fourth statement, micro-finance services enhanced my autonomy, had a mean value of 3.91, suggesting that microfinance clients are generally satisfied with the services provided by MFIs and feel empowered in various aspects of their lives, with 72% of respondents expressing satisfaction with micro-credit services. Overall, the average mean value for the women empowerment variable was 3.94, indicating that microfinance has made a significant contribution to women's empowerment, with the majority of borrowers feeling empowered through the program.

Table 8: Women's Empowerment

Item	Statements	Level of Women Empowerment					N	Mean	SD
		1	2	3	4	5			
1	I am confident in managing any financial difficulties using microfinance	0	0	15	52	33	100	4.13	0.693
2	Participating in Miro-finance improved my social status	3	7	17	41	32	100	3.92	1.042
3	My reading and writing skills improved after joining Microfinance	5	17	18	34	26	100	3.59	1.196
4	Microfinance services enhanced my autonomy	3	9	14	41	33	100	3.91	1.027
5	It is much more valued in family decision-making after using Microcredit.	2	5	11	38	44	100	4.19	0.919
	Mean							3.94	
"Note: 1=Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly agree"									

4.6. One-Way ANOVA

In this study, a One-way Analysis of Variance (ANOVA) is employed to assess potential variations in the demographic characteristics of female borrowers. The aim is to examine the influence of microfinance services on aspects such as economic empowerment, education enhancement, decision-making ability, and social status among women. These selected variables are considered

susceptible to the effects of microfinance. The demographic details under investigation encompass the age, marital status, and educational attainment of the borrowers.

4.6.1. Differences of Borrowers' Demographic Information on Women's Economic Empowerment

The findings presented in Table 9 indicate that there are no statistically significant differences observed in the age groups and marital status of microcredit clients, as evidenced by the p-values exceeding 5 percent (p=0.597, p=0.491). This suggests that women's economic empowerment through microfinance remains unaffected by variations in age and marital status among participants. In essence, neither age nor marital status plays a decisive role in influencing the economic empowerment of women through microfinance.

Moreover, the analysis reveals no significant disparity in the level of education (p=0.179). This implies that the impact of microfinance on women's economic empowerment is consistent across various educational backgrounds among female microcredit users. Consequently, differences in the level of education among respondents do not significantly influence the level of economic empowerment experienced by women through microcredit programs.

Table 9: ANOVA Test on the Level of Economic Empowerment of Women and Age, Marital Status, and Education

ANOVA						
		Sum of Squares	df	Mean Square	F-test	p-value
Age	Between Groups	25.944	20	1.297	.893	.597
	Within Groups	114.806	79	1.453		
	Total	140.750	99			
Marital_status	Between Groups	12.868	20	.643	.983	.491
	Within Groups	51.722	79	.655		
	Total	64.590	99			
Education_level	Between Groups	54.577	20	2.729	1.342	.179
	Within Groups	160.663	79	2.034		
	Total	215.240	99			

4.6.2. Differences of Borrowers' Demographic Information on Women's Education Enhancement

The research team conducted a One-way ANOVA test to assess the impact of microfinance on the educational improvement of women across various demographic factors, as outlined in Table 10. The results reveal non-significant differences in education enhancement among women across various age groups and marital status categories, with p-values exceeding 0.05 (p=0.325 and p=0.451). This suggests that the age and marital status of female borrowers do not play a significant role in influencing their educational improvement through microfinance. Notably,

irrespective of age or marital status, most borrowers are married and aged above 25 years old, and their involvement in education enhancement through microfinance remains consistent.

Furthermore, no significant differences are observed in the educational background of women (p=0.906), indicating that the level of education does not impact the extent of education enhancement facilitated by micro-credit loans. This underscores the notion that women, regardless of their educational background, experience similar levels of educational improvement through microfinance.

Table 10: ANOVA Test on the Level of Women's Education Enhancement and Age, Marital Status, and Education Level

ANOVA						
		Sum of Squares	df	Mean Square	F-test	p-value
Age	Between Groups	34.630	22	1.574	1.142	.325
	Within Groups	106.120	77	1.378		
	Total	140.750	99			
Marital_status	Between Groups	14.582	22	.663	1.021	.451
	Within Groups	50.008	77	.649		
	Total	64.590	99			
Education_level	Between Groups	31.844	22	1.447	.608	.906
	Within Groups	183.396	77	2.382		
	Total	215.240	99			

4.6.3. Differences of Borrowers' Demographic Information on Decision-Making and Social Status

According to the findings presented in Table 11, no statistically significant differences are observed in the decision-making and social status of microfinance clients based on age groups and marital status, with significance levels exceeding 0.05 (p=0.832 & p=0.203). This suggests that the age and marital status of women utilizing microfinance services do not significantly influence their decisions in family and personal matters, nor do they impact their social status through microfinance. In contrast, there are notable and statistically significant differences based on education level (p=0.027). Women with higher educational backgrounds demonstrate increased participation in family decision-making, particularly regarding children's education and marriage. Additionally, education level significantly influences the social status of women engaged in microfinance programs. Hence, women tend to modulate their decision-making involvement and social status based on their educational backgrounds.

Table 11: ANOVA Test on Level of Decision Making and Social Status and Age, Marital Status, and Education

		Sum of Squares	df	Mean Square	F-test	p-value
		ANOVA				
Age	Between Groups	22.005	21	1.048	.688	.832
	Within Groups	118.745	78	1.522		
	Total	140.750	99			
Marital_status	Between Groups	16.723	21	.796	1.298	.203
	Within Groups	47.867	78	.614		
	Total	64.590	99			
Education_level	Between Groups	71.625	21	3.411	1.852	.027
	Within Groups	143.615	78	1.841		
	Total	215.240	99			

4.6.4. Differences in Borrowers' Demographic Information on Women's Empowerment Through Micro-Finance

This segment aimed to assess the empowerment levels of women across different demographics, including age groups, educational levels, marital status, and locations, through the application of One-way ANOVA analysis.

The outcomes, as presented in Table 12, revealed no statistically significant differences for diverse age groups, marital statuses of borrowers, and educational levels, with significance values exceeding 0.05 (p=0.396, p=0.396, & p=0.293). These results suggest that the impact of microfinance does not exert a significant influence on the empowerment levels of women based on marital status, various age groups, and educational backgrounds among microfinance clients. In essence, the empowerment of women through microfinance remains consistent across different age groups, marital statuses, and educational backgrounds of microcredit clients.

Table 12: ANOVA Test on the Level of Women Empowerment and Age, Marital Status, and Education Level"

		Sum of Squares	df	Mean Square	F-test	p-value
		ANOVA				
Age	Between Groups	22.588	15	1.506	1.071	.396
	Within Groups	118.162	84	1.407		
	Total	140.750	99			
Marital_status	Between Groups	10.467	15	.698	1.083	.384
	Within Groups	54.123	84	.644		
	Total	64.590	99			

Education_level	Between Groups	37.813	15	2.521	1.193	.293
	Within Groups	177.427	84	2.112		
	Total	215.240	99			

4.7. Correlation

The study conducted a correlation analysis between the independent and dependent variables, which is displayed in Table 13. This analysis aimed to identify the relationship between each independent variable and the dependent variable and to detect any issues related to multicollinearity. Multicollinearity occurs when variables are highly correlated with each other, which can create problems in statistical analysis. The results of the analysis indicate that there is no multicollinearity problem in this study, as all variables have weak correlations with each other.

Table 13: Correlation Matrix

Variables	"Economic Empowerment"	"Education Enhancement"	"Accessibility of Microfinance"	"Decision Making and Social Status"	"Women Empowerment"
Economic Empowerment	1				
Education Enhancement	0.595**	1			
Accessibility of Micro-finance	0.491**	0.501**	1		
Decision-Making and Social Status	0.465**	0.306**	0.561**	1	
Women empowerment	0.579**	0.486**	0.668**	0.676**	1

**Correlation is significant at 5% level (p > 0.05)

5. Result and Discussion

Table 14 displays the findings of the multiple regression analysis carried out to investigate the factors influencing women's empowerment through microfinance. The analysis tested three alternative hypotheses that were derived from previous research studies. The first hypothesis sates that women's economic empowerment through microfinance has a positive impact on their overall empowerment. The second hypothesis suggests that microfinance programs that enhance women's education have a positive impact on their empowerment. The third hypothesis proposes that microcredit loans that improve women's decision-making abilities and social status have a positive impact on their empowerment.

The analysis using multiple regression demonstrated a noteworthy and favourable correlation between women's economic empowerment achieved through microfinance and their overall empowerment. This outcome lends support to the hypothesis that microfinance initiatives

play a constructive role in enhancing women's economic empowerment, consequently exerting a substantial influence on their empowerment, with a statistically significant impact at a 5% significance level.

According to the multiple regression analysis, the second factor that positively impacts women's empowerment is education enhancement through microfinance. The results show that improving women's education level through microfinance has a significant impact on their empowerment at a 5% level. This finding is in line with the hypothesis, which suggests that education is crucial for empowerment, and microfinance can contribute to enhancing women's education, thus increasing their level of empowerment.

The results of the multiple regression analysis confirm "that the third variable, namely decision making and social status, has a positive and significant impact on women's empowerment through microfinance at a 1% significance level." This finding supports the hypothesis that microfinance can enhance women's decision-making abilities and social status, thereby positively contributing to their empowerment. The increase in decision-making and social status through Microcredit is associated with an increase in women's empowerment level. Moreover, the results reveal that the R-squared value is 0.56, indicating that all independent variables collectively explain 56% of the variance in women's empowerment through microfinance. Moreover, the Durbin-Watson test statistics of 1.82, 2.10, and 2.46 indicate that there is no substantial evidence of autocorrelation in the residuals of the regression model. These values, which are not significantly different from the expected value of 2, fall within the acceptable range of 1.5 to 2.5. Consequently, we conclude that the residuals are independent, supporting the assumption of no autocorrelation. This enhances the reliability of the multiple regression analysis, suggesting that the model's results are not biased by the correlation of errors and can be interpreted with confidence.

Table 14: Multiple Regression Analysis

Variables	coefficient	p-value	t-statistic	Durbin Watson-test
EE	0.235	0.0130**	2.505	1.82
EDU	0.187	0.0200**	2.337	2.10
DMSS	0.523	0.0000***	6.761	2.46
Constant"	0.356	0.287	1.071	
R^2	0.56			
Note: *, **, *** denote significance at 10%, 5%, and 1% respectively.				

6. Conclusion

In conclusion, the case study of Mazar-i-Sharif City demonstrates the positive impact of microfinance on women's empowerment in Afghanistan. The study shows that microfinance has significantly contributed to the economic and financial empowerment of women in the city, as borrowers experience greater economic freedom and the ability to address financial

challenges. Additionally, microfinance has improved the education level of women and enhanced their decision-making and social status, resulting in a more empowered position for women in the community. The study also highlights the challenges in accessing microfinance services, particularly for those who lack collateral or a guarantor. Therefore, there is a need for policymakers and microfinance institutions to address these challenges and make microfinance more accessible to women in Afghanistan, particularly in urban areas. Overall, this case study provides valuable insights into the positive impact of microfinance on women's empowerment in Afghanistan and emphasizes the importance of further investment in microfinance as a means of alleviating poverty and empowering women.

References

Addae-Korankye, A., & Abada, A. (2017). Microfinance and women empowerment in Madina in Accra, Ghana. *Asian Economic and Financial Review*, *7*(3), 222–31. https://doi.org/10.18488/journal. aefr/2017.7.3/102.3.222.231

Addai, B. (2017). Women Empowerment Through Microfinance: Empirical Evidence from Ghana. *Journal of Finance and Accounting*, *5*(1), 1. https://doi.org/10.11648/j.jfa.20170501.11

Afghanistan Literacy rate. (2018). Literacy Rate in Afghanistan. https://countryeconomy.com/demography/ literacy-rate/afghanistan#:~:text=Afghanistan%20rises%20the%20literacy%20rate,in%20 Afghanistan%20is%20very%20low.

Akhter, J., & Cheng, K. (2020). Sustainable empowerment initiatives among rural women through microcredit borrowings in Bangladesh. *Sustainability (Switzerland)*, *12*(6). https://doi.org/10.3390/ su12062275

Al-Mamun, A., Wahab, S. A., Nurul, M., Mazumder, H., & Su, Z. (2014). Empirical investigation on the impact of Microcredit on women's empowerment in urban peninsular Malaysia. In *Source: The Journal of Developing Areas* (Vol. 48, Issue 2).

Al-Shami, S. S. A., Majid, I., Mohamad, M. R., & Rashid, N. (2017). Household welfare and women empowerment through microcredit financing: Evidence from Malaysia microcredit. *Journal of Human Behavior in the Social Environment*, *27*(8), 894–910. https://doi.org/10.1080/10911.359.20 17.1345341

Al-Shami, S. S. A., Razali, M. M., Majid, I., Rozelan, A., & Rashid, N. (2016). The effect of microfinance on women's empowerment: Evidence from Malaysia. Asian Journal of Women's Studies, 22(3), 318– 337. https://doi.org/10.1080/12259.276.2016.1205378

Alshebami, A. S., & Khandare, D. M. (2015). The Role of Microfinance for Empowerment of Poor Women in Yemen. *International Journal of Social Work*, *2*(1). https://doi.org/10.5296/URL

Ashraf, N., Karlan, D., & Yin, W. (2010). Female Empowerment: Impact of a Commitment Savings Product in the Philippines. World Development, 38(3), 333–344. https://doi.org/10.1016/j. worlddev.2009.05.010

Awojobi, O. N. (2014). Empowering women through micro-finance: Evidence from Nigeria. *Australian Journal of Business and Management Research*, *4*(1), 17. https://www.ajbmr.com/articlepdf/aus-29- 195i04n01a3.pdf

Batinge, B. K., & Jenkins, H. (2021). Gender and poverty reduction in Ghana: the role of microfinance institutions. *International Journal of Economics and Finance*, *13*(8), 1–71. https://doi.org/10.5539/ ijef.v13n8p71

Bawah, M., Sadiq, M. A., & Antwi, J. (2023). Assessing the Impact of Microfinance Schemes to Meet the Challenging Needs of Women in Human Resource Development: Sagnarigu Municipality as a Case Study. *Saudi J Bus Manag Stud*, *8*(3), 38-45. https://doi.org/10.36348/sjbms.2023.v08i03.001

Bercaw, D. W. (2012, January). Empowering women through microfinance: Microfinance interventions in Ghana and South Africa. In *International Forum of Teaching and Learning* (Vol. 8, No. 1, pp. 23–36).

Blumberg, B., Cooper, D., & Schindler, P. (2014). *EBOOK: Business Research Methods*. McGraw Hill. https://books.google.com.af/books?hl=en&lr=&id=9sovEAAAQBAJ&oi=fnd&pg=PA1&dq=Cooper+%26+Schindler,+2014&ots=2C0600QhuE&sig=h7adxEuoikeRZO8HxhuCcWMSgvc&redir_esc=y#v=onepage&q=Cooper%20%26%20Schindler%2C%202014&f=false

Brink, P. J., & Wood, M. J. (1998). Descriptive designs. *Advanced design in nursing research*, *2*, 287-307. https://books.google.com.af/books?hl=en&lr=&id=D5E5DQAAQBAJ&oi=fnd&pg=PA287&dq=brink+and+wood+1998&ots=h6F_Tc-KZi&sig=EVefQGY5YzlD8aT4KAnqdYlSNrM&redir_esc=y#v=onepage&q=brink%20and%20wood%201998&f=false

Campbell, K. (2017). To Eradicate Poverty in Afghanistan, Women's Empowerment is Essential. Retrieved from https://www.womenforwomen.org/blogs/eradicate-poverty-afghanistan-womens-empowerment-essential

Central Statistics Organization (2018). *AFGHANISTAN LIVING*. Retrieved from https://www.ilo.org/surveyLib/index.php/catalog/2114/download/17907

Chaudhary, M. K. (2022). A Contribution of Microfinance in Women Empowerment: A Case of Janakpur Municipality, Nepal. *International Research Journal of MMC (IRJMMC)*, *3*(1), 32–39. https://doi.org/10.3126/irjmmc.v3i1.44191

Chhay, D. (2011). Women's economic empowerment through microfinance in Cambodia. *Development in Practice*, *21*(8), 1122–1137. https://doi.org/10.1080/09614.524.2011.606891

Colaco, F. X., & Rangamani, K. T. (2013). Impact of Microfinance on Empowerment of Women: A Study. *Asian Journal of Research in Business Economics and Management*, *3*(12), 191-205.

Corsi, M., Botti, F., Rondinella, T., & Zacchia, G. (2006). Women and microfinance in Mediterranean countries. *Development*, *49*(2), 67–74. https://doi.org/10.1057/palgrave.development.1100247

Debnath, D., Rahman, M. S., Acharjee, D. C., Latif, W. U., & Wang, L. (2019). Empowering women through Microcredit in Bangladesh: An empirical study. *International Journal of Financial Studies*, *7*(3). https://doi.org/10.3390/ijfs7030037

Doane, D. P., & Seward, L. E. (2011). Measuring skewness: a forgotten statistic? *Journal of Statistics Education*, *19*(2). https://doi.org/10.1080/10691.898.2011.11889611

Fayyaz, S., Hakim, R. A., & Khan, S. J. M. (2016). Impact of Microcredit on women borrower's quality of life in Bahawalpur, Pakistan. *Journal of Advanced Research in Business and Management Studies*, *5*(1), 72-86. https://www.akademiabaru.com/submit/index.php/arbms/article/view/1214

Ganle, J. K., Afriyie, K., & Segbefia, A. Y. (2015). Microcredit: Empowerment and disempowerment of rural women in Ghana. *World Development*, *66*, 335–345. https://doi.org/10.1016/j.worlddev.2014.08.027

Garikipati, S. (2008). The Impact of Lending to Women on Household Vulnerability and Women's Empowerment: Evidence from India. *World Development*, *36*(12), 2620–2642. https://doi.org/10.1016/j.worlddev.2007.11.008

Granlund, F. (2013). The impact of Microcredit on Women's Empowerment. A case study of Microcredit in the Tangail district, Bangladesh. https://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=3732033&fileOId=3789388

Gubhaju, R. (2023). Women Empowerment in Self-Help Groups through Microfinance: A Case Study of Rautahat District. *Apex Journal of Business and Management, 1(1), 33–54.* https://doi.org/10.61274/apxc.2023.v01i01.004

Gupta, N., & Mirchandani, A. (2020). Corporate governance and performance of microfinance institutions: recent global evidence. *Journal of Management and Governance*, *24*(2), 307–326. https://doi.org/10.1007/s10997.018.9446-4

Haidari, A. (2018). The Contribution of Women to Household Income, Through Participation in Micro-Credit.

Hussein, M. H. (2009). "State of Microfinance in Afghanistan By." Institute of Microfinance (InM): Retrieved from http://inm.org.bd/wp-content/themes/inm/pdf/Afghanistan.pdf

Idrees, B., Ilyas, R., & Cheema, S. N. (2012). Role of Microcredit in Women Empowerment in Pakistan. *Academic Research International*, *2*(2), 464. https://www.academia.edu/download/40686049/micro_crediting.pdf

Kabeer, N. (2001). Conflicts over credit: Re-evaluating the empowerment potential of loans to women in rural Bangladesh. World Development, 29(1), 63–84.

Kato, M. P., & Kratzer, J. (2013). Empowering Women through Microfinance: Evidence from Tanzania. *ACRN Journal of Entrepreneurship Perspectives*, *2*, 31–59.

Khan, A., & Zyck, S. A. (2012). The Civil-Military Fusion Women & Gender in Afghanistan.

Khan, R. E. A. (2012). Microfinance and women empowerment: A case study of District Bahawalpur (Pakistan). *African Journal of Business Management*, *6*(12). https://doi.org/10.5897/ajbm11.2407

Khan, S. T., Bhat, M. A., & Sangmi, M. U. D. (2023). Impact of microfinance on economic, social, political and psychological empowerment: Evidence from women's self-help groups in Kashmir Valley, India. *FIIB Business Review*, *12*(1), 58-73. https://doi.org/10.1177/231.971.4520972905

Kirigiti Josephat, P., Kabyemela Fulment, A., & Matunga, B. (2017). *Women's Empowerment and Microfinance: Evidence from Kondoa District* (Vol. 9, Issue 1).

Kline, R. B. (2011). *Principles and practice of structural equation modelling*. Guilford publications.

Lavoori, V., & Paramanik, R. N. (2014). Microfinance impact on women's decision making: A case study of Andhra Pradesh. *Journal of Global Entrepreneurship Research*, *pp. 4*, 1–13. http://www.journal-jger.com/content/4/1/11

LoBiondo-Wood, G., & Haber, J. (1994). Nursing research: Methods, critical appraisal, and utilization. *Philadelphia: Mosby*.

Mannah-Blankson, T. (2018). Gender inequality and access to microfinance: Evidence from Ghana. *Journal of African Development*, *20*(2), 21–34. https://doi.org/10.5325/jafrideve.20.2.0021

Mariia, M. J., Naveen, I., Muhammad, H., Khan, A., Kakar, P., Wardak, F., & Rajabi, S. (2019). The Role of Women in the Economic Development of Afghanistan. https://dx.doi.org/10.2139/ssrn.3807706

Mashwani, H. U. (2017). Female education in Afghanistan: Opportunities and challenges. *International Journal for Innovative Research in Multidisciplinary Field*, *3*(11). Retrieved from https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3084799_code2796396.pdf?abstractid=3084799&mirid=1

Mayoux, L. (2000). Microfinance and the empowerment of women: A review of the critical issues. Social finance working paper no. 2. Geneva: ILO.

MDG. (2005). Millennium Development Goals of Afghanistan: country report. Retrieved from https://www.undp.org/sites/g/files/zskgke326/files/publications/Afghanistan_MDGReport_2005.pdf

Modi, A., Patel, K. J., & Patel, K. M. (2014). Impact of microfinance services on rural women empowerment: An empirical study. *IOSR Journal of business and management*, *16*(11), 1-8. https://www.researchgate.

net/profile/Kundan-Patel-4/publication/284005315_Impact_of_Microfinance_Services_on_ Rural_Women_Empowerment_An_Empirical_Study/links/5f9be3e0299bf1b53e5147a4/Impact- of-Microfinance-Services-on-Rural-Women-Empowerment-An-Empirical-Study.pdf

Mudaliar, A., & Mathur, M. A. (2015). *Women Empowerment through Microfinance* (Vol. 01, Issue 2).

Mulugeta, W., & Gutu, F. (2016). The Role of Microfinance on Women as Economic Empowerment in Southwest Ethiopia: In the Case of Four Woredas around Gilgel-Gibe Hydroelectric Power Dam. *Global Journal of Management and Business Research*, *16*(B6), 1-9.

Nazari, R. (2016). Microfinance Services in Afghanistan and Their Impacts on Income Generation: The Case of Microfinance in Herat City.

Nehad, F. (2017). Women Entrepreneurship in Afghanistan and Success Determinants of Afghan Women Entrepreneurs-Case Study of Kabul City. Retrieved from https://www.academia.edu/97042716/ Freshta_Nehad_Women_Entrepreneurship_in_Afghanistan_and_Success_Determinants_of_ Afghan_Women_Entrepreneurs_Case_Study_of_Kabul_City

Nemat, O. A. (2011). Afghan women at the crossroads: Agents of peace or its victims. *The Century Foundation*. http://www.peacewomen.org/sites/default/files/hr_afghanwomenatthecrossroads_ march2011_0.pdf

Nichols, M. (2010). Microfinance faces hurdles in empowering Afghan women: Accessed on May 5, 2023. Retrieved from https://www.reuters.com/article/uk-afghanistan-microfinance/microfinance-faces- hurdles-in-empowering-afghan-women-idUKTRE6BR0CX20101228?edition-redirect=uk

Noor, H. E., Qarqeen, M., Matin, A., & Allawdin, E. Z. (2008). The Minister Afghanistan National Disaster Management Authority (ANDMA) Sector Coordinator Social Protection.

Pallant, J. F., & Lae, L. (2002). Sense of coherence, well-being, coping and personality factors: Further evaluation of the sense of coherence scale. *Personality and individual differences*, *33*(1), 39-48. https://doi.org/10.1016/S0191-8869(01)00134-9

Phuoc, A., & Nguyen, T. (2018). *Microfinance and Women's Empowerment: An Empirical Evidence in Vietnam*. https://scholars.unh.edu/honors/386

Pitt, M. M., Khandker, S. R., & Cartwright, J. (2006). Empowering women with microfinance: Evidence from Bangladesh. *Economic Development and Cultural Change*, *54*(4), 791–831. https://doi. org/10.1086/503580

Rahimi, W. M. (1991). "Status of Women in Afghanistan:" Social and Human Sciences in Asia and the Pacific RUSHSAP Series on Monographs and Occasional Pape: Retrieved from https://unesdoc. unesco.org/ark:/48223/pf000.009.1693

Rahman, A. (1999). Micro-credit initiatives for equitable and sustainable development: Who pays? World Development, 27(1), 67–82.

Saeed Parto & Akshay Regmi. (2008). "RECONSTRUCTING A FGHANISTAN S ERIES A Critical Assessment of Microfinance." (March). Afghanistan Public Policy Research Organization: Retrieved from https://reliefweb.int/sites/reliefweb.int/files/resources/58A702DE180D56E049257 79D00202309-Full_Report.pdf

Sengupta, R., & Aubuchon, C. P. (2008). The Microfinance Revolution: An Overview. http://grameen-info. org/bank/the16.html.

Sulaiman D. Muhammad. (2012). Women empowerment and microfinance: A case study of Pakistan. *AFRICAN JOURNAL OF BUSINESS MANAGEMENT*, *6*(22). https://doi.org/10.5897/ajbm11.1973

Taylor, G., & Pereznieto, P. (2014). They are shaping policy for development. Review of evaluation approaches and methods used by interventions on women's and girls' economic empowerment. Acknowledgements.

Tiago, M. D. S. (2021). *The impact of retailtainment on purchase intentions* (Master›s thesis). https://repositorio.iscte-iul.pt/bitstream/10071/24613/1/master_mafalda_santos_tiago.pdf

Ullah, F. (2017). Veil of Resilience: How the Concept of Honor Affects Female Education in Afghanistan. Retrieved from https://cedar.wwu.edu/cgi/viewcontent.cgi?article=1644&context=wwuet

UN Women. (2 April 2013). Press Release: UN Women in Afghanistan strongly condemns "honor killings" of women and girls. Retrieved from https://www.unwomen.org/en/news/stories/2013/4/press-release-on-honour-killings-in-afghanistan

UNDP. (2021). Human Development Report: Gender Inequality Index (GII). Retrieved from https://hdr.undp.org/data-center/thematic-composite-indices/gender-inequality-index#/indicies/GII

UNESCO. (25 September 2023). Community-based Literacy and Complementary Learning Possibilities. Retrieved from https://www.unesco.org/en/node/85308#:~:text=The%20literacy%20rate%20of%20Afghanistan,Literacy%20and%20Skills%2Dbased%20Literacy

Wall, J., & Byrd, W. (2001). "Brief Overview of Afghanistan 's Economy." (2001): 1–3. Retrieved from http://www.mafhoum.com/press2/71E12.pdf January 10, 2019

World Economic Forum. (2023). Global Gender Gap Report 2023. Retrieved from https://www3.weforum.org/docs/WEF_GGGR_2023.pdf

Zulfiqar, H., & Tabasum, S. (2023). Islamic Microfinance and Women Empowerment: A Case Study of Akhuwat Foundation. *Journal of Gender and Social Issues*, *22*(1). Retrieved from https://jgsi.fjwu.edu.pk/jgsi/article/view/352/281

RESEARCH ARTICLE

SUSTAINED CAPITAL FLOWS TO EMERGING MARKET ECONOMIES

Anıl TUĞRAL[*] [iD]

Mete Han YAĞMUR[**] [iD]

Abstract

A recurrent pattern in international economics is abundant global liquidity and capital flows, followed by monetary policy tightening and capital outflows from emerging markets (EMs). This pattern often results in exchange rate instability, balance of payment problems, and financial turbulences in EMs. This study aims to identify the determinants of sustained capital flows to EMs. To this end, episodes of sustained capital flows above a threshold value are used as binary variables in constructing a complementary logarithmic framework. The results indicate that to preserve capital inflows, EMs should maintain stable and positive gross domestic product (GDP) growth, restrain exchange rate volatility, and hold interest rates low. External factors, such as GDP growth and interest rates in developed countries, also affect capital flows to EMs. While EMs cannot affect external variables, maintaining a sound macroeconomic environment at home would insulate them from the financial turbulences generated by global factors.

Keywords: Capital flows, financial stability, emerging markets

JEL codes: F21, F32, G01

1. Introduction

During the past few decades, the world economy has witnessed the increasing role of international capital flows in countries' economic growth and macroeconomic stability. Particularly in emerging markets (EMs), foreign capital opens the way for growth and development through financing new investments, raising productive capacity, and creating new employment opportunities. The role of foreign capital in China's economic success is a case in point. Since China announced its reform and opening policy in 1978, foreign capital has been a significant source of economic growth. In addition to stimulating economic development, foreign capital allowed China to accumulate substantial current account surpluses and foreign reserve holdings (Sui, 2019).

Nevertheless, unstable capital inflows or sudden capital outflows may generate exchange rate and balance of payment problems in EMs. The currency crises in Mexico in 1994, the Asian

---

*　Yıldız Technical University, Department of Economics, E-mail: atugral@yildiz.edu.tr, ORCID: 0000-0001-9526-388X

**　Istanbul Technical University, Department of Economics, E-mail: myagmur@itu.edu.tr, ORCID: 0000-0002-7630-6335

financial crises in 1997, and the Russian ruble crisis in 1998 are remarkable economic downturns associated with capital flow fluctuations. Likewise, the reversed extreme liquidity period, following the recovery of advanced economies (AEs) from the 2008 Global Financial Crisis (GFC), diverted interests toward risks associated with international capital flows in EMs. Also, recently, to mitigate the tightening effects of the COVID-19 pandemic on financial markets and economic activities, many central banks undertook expansionary monetary policy measures and provided substantial liquidity to the markets. However, as inflation rates surged after the pandemic, monetary policy stances were reversed, and central banks started increasing policy interest rates. Subsequent international liquidity shortages and higher interest rates in the major AEs, particularly in the United States (US), resulted in capital outflows from EMs.

Hence, abundant international liquidity and capital flows, followed by monetary policy tightening and capital outflows from EMs, is a recurrent pattern. Because this pattern evokes credit constraints, higher funding costs, and exchange rate fluctuations, it makes EMs more prone to financial risks and prevents their sustainable growth prospects. In this regard, investigating the impact of foreign capital inflows on the economic growth of East Asian countries, Baharumshah and Thanoon (2006) find that short-term capital inflow hurts the countries' short-term and long-term growth prospects. Accordingly, especially in the aftermath of the GFC, EMs have tried to mitigate capital flow fluctuations by implementing some capital flow management measures. Nevertheless, the effectiveness of such measures is limited in attaining their goals (Norring, 2022). Furthermore, Blundell-Wignall and Roulet (2014) find that increased capital controls after 2008 negatively affected business investments.

Against this background, this study asserts that EMs benefit more from capital inflows if sustained above a certain level, are relatively less volatile, and last for a considerable time. Also, given the ineffectiveness of capital control measures, policymakers should identify and observe the determinants of sustained capital inflows to EMs. Hence, different from the existing studies that analyze the determinants of capital flows (e.g., Calvo et al. 1993; Chuhan et al. 1998; Kim 2000; Baek 2006; Cerutti et al. 2019), extreme episodes of capital flows (e.g., Forbes and Warnock 2012; Calderon and Kubota 2013; Hlaing and Kakinaka 2019), and the effects of policies on capital flows (e.g., Nugent 2019; Frost et al. 2020), this study focuses on identifying and analyzing capital inflows to EMs that is above a certain level and maintained at this level for a specified period.

To this end, episodes of capital flows that last at least three consecutive quarters of a year above a threshold are identified, and this data is transformed into binary variables. Then, utilizing the complementary logarithmic framework, determinants of sustained capital flows are estimated. Our main results indicate that several EM characteristics and some global factors affect sustained capital inflow episodes. For instance, maintaining high GDP growth rates, low interest rates, and low risk factors would increase the likelihood of sustained capital inflow episodes. While EMs would not have any considerable effect on global factors, such as the world GDP and the world interest rates, maintaining a sound macroeconomic environment at home would also insulate EMs from the financial turbulences generated by fluctuations in external variables.

The paper proceeds as follows. The following section presents the literature review on capital flow dynamics. Section 2 explains the capital flow data and defines the methodology for generating sustained capital inflow episodes. Section 3 presents and discusses empirical results. The last section concludes.

2. Literature Review

Along with the globalization waves and the emergence of persistent current account imbalances, the 1980s witnessed increasing international capital flows among industrial countries (Turner, 1991). The rise in capital flows to emerging and developing countries started in the 1990s (Calvo et al., 1996). However, capital flows to these countries were interrupted by the currency crisis in Mexico in 1994 and again by the Asian financial crisis in 1997.

To explain the capital flows to EMs in the 1990s, economists debate the relative importance of the attractiveness of domestic conditions in EMs (i.e., the pull factors), such as their stronger economic performances, and the unfavorable conditions in AEs (i.e., the push factors), such as the cyclical movements in world interest rates. In a seminal paper, Calvo et al. (1993) investigate the characteristics of capital flows to Latin American countries. The authors use foreign exchange reserves as a proxy for capital flows based on the idea that capital inflows boost foreign exchange reserves. They find that primarily external factors, like recessions and the low interest rates in the US, are the most crucial determinants that push capital into Latin American countries. In addition to its determinants, the authors also point out that capital outflows would make Latin American countries more prone to economic crises. Accordingly, Calvo et al. (1993) propose some policy recommendations, such as taxing short-term capital borrowing from abroad, while they also recognize the limited effects of such interventionist policies.

Chuhan et al. (1998) criticize the proxy choice of Calvo et al. (1993) based upon the imperfect co-movement between capital flows and foreign exchange reserves. The authors argue that developing countries use foreign exchange reserves to eliminate fluctuations in exchange rates stemming from capital flow movements, generating a distorted relationship between capital inflow and foreign exchange reserves. Instead of foreign exchange reserves, Chuhan et al. (1998) use bonds and equity flows to developing countries from the US as a measure of capital flows. Their findings indicate that the interest rates and industrial production in the US, as well as some developing country-specific factors, such as credit rating and equity rates of return, are important determinants of capital flow surges in the late 1980s and early 1990s. The authors also point out that while equity flows are more sensitive to global factors, the impact of domestic factors is more substantial for bond flows. Fernandez-Arias (1996) further shows that middle-income countries' creditworthiness is mainly driven by a decline in international interest rates, so creditworthiness cannot be used to support the "pull" interpretation. Overall, the author asserts that "push factors" are more important for capital flows to middle-income countries.

The debate over pull versus push factors on capital flows carried over in the early 2000s. For instance, Kim (2000) argues that the surge in capital flows to Mexico, Chile, Korea, and Malaysia in the 1990s was mainly driven by the decrease in the world interest rates and the recession in industrialized countries, while domestic factors, such as productivity and demand shocks, are somewhat less critical. Nevertheless, Baek (2006) shows that the factors that drive capital flows to Latin America and Asia differ. While the risk appetite of foreign investors and external factors contribute to capital flows to Asian countries, inflows to Latin American countries are pulled mainly by domestic factors. The author attributes this difference to the availability of asset varieties in these two regions. While private sector equities are abundant in Asia, most portfolio investments in Latin America consist of government debt securities.

In sum, it is widely agreed that while country-specific characteristics are inherent to investors' decisions, global factors are also important in determining capital flows to EMs. Specifically, factors like the global risk environment, the US or world interest rates, and the level of economic activities in developed countries affect capital flows to EMs.

The GFC in 2008 was a significant turning point in the capital flows literature. Along with the low interest rates, the risky activities of financial institutions on mortgage-backed securities gave rise to the housing bubble in the US. As the housing bubble burst, the world economy experienced the most severe economic crisis since the Great Depression in 1929. In response, the Federal Reserve System (FED) and other major central banks started following expansionary monetary policies through asset purchase programs. Hence, global liquidity and international capital flows increased dramatically in this period. Nevertheless, in 2013, the FED announced that it would reduce the amount of assets it purchases (also known as tapering tantrum). This policy change implied the beginning of a decline in global liquidity and a decrease in capital flows to EMs.

Fratzscher (2012) presents an in-depth analysis of the capital flow dynamics around the GFC. The author shows that while the risk phenomenon and push factors drive the capital flows during the crisis, the effects of pull factors are more prominent in the pre-crisis and post-crisis periods. Likewise, Anaya et al. (2017) argue that the expansionary monetary policies of the FED in response to the recession in the post-GFC period pushed flows from the US to EMs. The authors further show that portfolio flows played a vital role in the transmission of the FED's policies to output growth and real exchange rate appreciation in EMs. Lim et al. (2014) also find evidence about the existence of US monetary policies' spillover effects through financial flows to EMs, and they show that portfolio investment is more sensitive than foreign direct investment to quantitative easing of the FED. In contrast to most existing studies, Clark et al. (2020) discuss that the effects of AEs' monetary policies on EMs are overemphasized and are not predominant; instead, output growth differentials between the two groups of countries are more significant in capital flows to EMs.

The studies above indicate that the openness of financial accounts and globalized markets make EMs more sensitive toward developments in AEs, primarily those in the US. A significant risk

associated with financial openness is the sudden stop of capital flows, which typically leads to credit constraints, balance of payment problems, economic uncertainty, and sharp decreases in economic activity (Calvo, 1998). Since capital inflow means foreign currency entry into a country, it also affects the foreign exchange market. In this regard, Baum et al. (2017) argue that the financial indicators in countries with higher exchange rate variability and inflation rates are more vulnerable to capital inflows.

Hence, the literature suggests that economic variables such as the level of economic activity, interest rates, and risk factors in EMs and AEs are the main determinants of international capital flows. Nevertheless, precarious capital flows may cause significant problems in EMs. For instance, credit constraints and sharp appreciation of the real exchange rate may result in lower economic activity. Therefore, in the following section, this study aims to identify the determinants of steady and sustained capital flows, which are inherent to maintaining a stable macroeconomic environment.

3. Data and Methodology

3.1 Capital Flow Data and Principles

The capital flow data is drawn from the International Monetary Fund's International Financial Statistics (IFS) database. The data is sorted under the balance of payments account based on the residency principle, which differentiates residents' and non-residents' transactions on the financial account. We analyze three different types of capital flows, namely, portfolio investment (PI), other investments (OI), and foreign direct investments (FDI). PI is defined as investments in securities such as equities and debt securities issued by the public and private sectors. OI are transactions not sorted under a specific title of the financial account; they include transactions such as currency and deposits, loans, and trade credits. Lastly, investments are classified as FDI if an investor owns at least a 10% share of a firm abroad.

All transactions are categorized as the net acquisition of financial assets and the net incurrence of liabilities. For instance, an FDI by a non-resident to a domestic economy is recorded as an increase in the domestic economy's liabilities. Based on this principle, a negative financial account balance, namely the difference between the net acquisition of financial assets and the net incurrence of liabilities, represents a net inflow to an economy. Accordingly, the net incurrence of liabilities is drawn as a proxy of capital inflows by non-residents. The data spans from 2005q1 to 2022q4. Throughout the study, year-over-year change in the four-quarter-sum of capital inflows is used.

The sample countries are selected based on the EM classification of Duttagupta and Pazarbasioglu (2021). The authors classify EM economies based on their income levels and resemblance to advanced economies regarding economic growth, ability to produce higher-value-added goods, participation in global trade, and integration with the world financial markets. Accordingly, the

authors identify 20 countries. From this list, we omit oil-rich and larger countries (China, Saudi Arabia, and the United Arab Emirates) and the countries that do not have sufficient quarterly data for the period under consideration. Accordingly, the countries analyzed in this paper are Brazil, Chile, Colombia, Hungary, India, Indonesia, Mexico, the Philippines, Poland, South Africa, Thailand, and Turkiye. For each of the 12 countries, there are 72 quarters of data, which makes 864 quarters in total.

Figure 1 presents the average capital flows of the subject countries between 2005 and 2022. All PI, OI, and FDI flows have a slightly increasing trend in the pre-GFC era, possibly due to expansionary monetary policies the FED started to follow in early 2000. With the GFC, a dramatic decline occurred in all types of capital flows, followed by a sharp upturn until the reversal of the FED's expansionary policies in 2013. In the following years, capital flow dynamics can be attributed to the lower interest rates in AEs and some country-specific developments in EMs. In 2016, global FDI flows fell by 13% due to weak global economic growth and world trade volumes (UNCTAD, 2017). Accordingly, a significant decline in FDI is observed for the EMs analyzed in this paper. The latest common factor that affects capital inflows to EMs is the COVID-19 pandemic that broke out in late 2019. The pandemic triggered a severe decline in inflows in all types of capital.
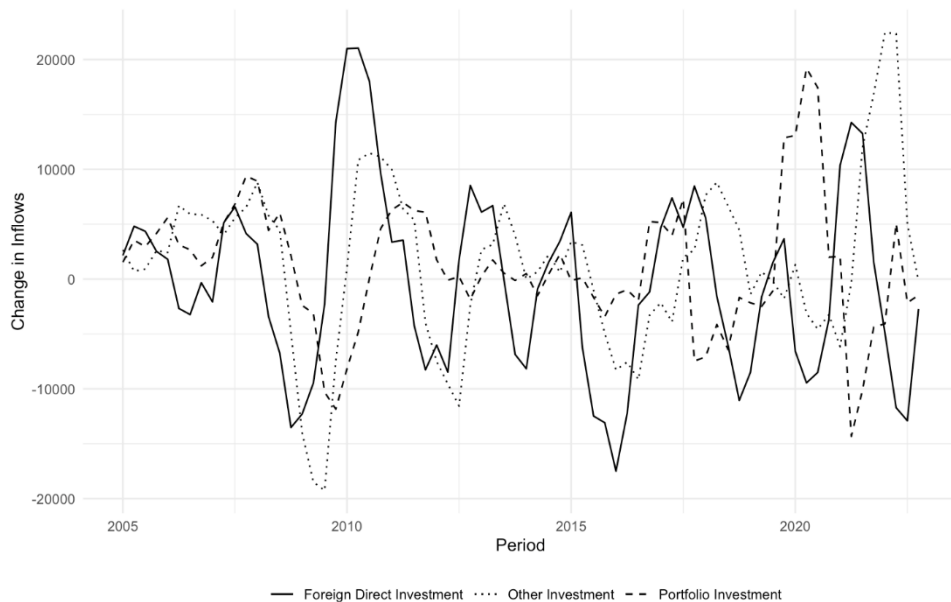
Figure 1: Average Capital Flows (in million USD)
Source: Own elaboration based on IMF (2023).

Figure 2 illustrates the volatility of capital flows generated by five-year rolling standard deviations (SD). In the post-GFC era, all types of capital flows became more volatile. While the volatilities

of PI and OI have converged in recent years, the volatility of FDI has increased dramatically in 2020, possibly due to the effects of the COVID-19 pandemic on the international business environment.
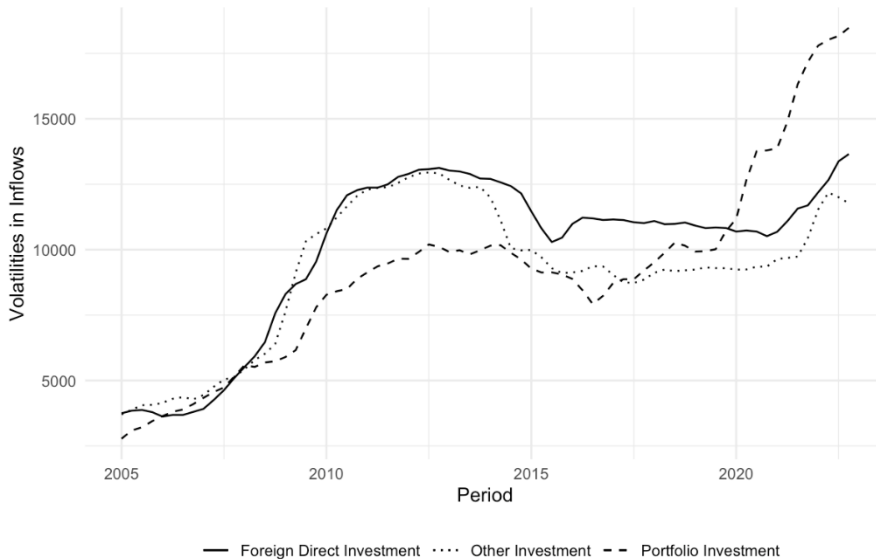
Figure 2: Volatilities in Capital Flows (5-year rolling SD, in million USD)

Source: Own elaboration based on IMF (2023).

3.2 Constructing Sustained Capital Inflow Episodes

As explained above, capital inflows are considered more desirable if they are relatively high, less volatile, and last for a reasonable amount of time. The existing literature involves several studies that analyze extreme capital flow episodes or surges. However, surge episodes may be part of a volatile capital flow period; they may last for a short period and may be interrupted by sharp decreases. Thus, this study aims to differentiate high and stable capital inflow episodes to EMs and identify their determinants.

To mark extreme capital flow movements, Forbes and Warnock (2012) define capital flow episodes based on the SD and length of capital flows. This paper transforms Forbes and Warnock's (2012) methodology to define sustained capital inflow episodes. First, four-quarter capital inflows (CF) are summed up, and their year-over-year changes are calculated as represented by the following two equations:

$$CF_t = \sum_{i=0}^{3} INFLOW_{t-i} \qquad (1)$$

$$\Delta CF_t = CF_t - CF_{t-4} \tag{2}$$

Then, the 5-year rolling means and SD of ΔCF_t are computed. In Forbes and Warnock's (2012) framework, a surge episode starts when ΔCF_t climbs up two SD above the mean and ends when it falls below one SD band above its mean. To consider the permanency of capital flows, this study uses 1 and 0.5 SD bands, and sustained capital is defined as episodes of inflows that last at least three quarters. The rationale for using narrower bands is that there are a few quarters in which ΔCF_t remains above the two SD bands for at least three quarters.

Figure 3 exhibits this methodology for Chile. The solid line represents the change in capital inflows to Chile, and the dotted and dashed lines are the 0.5 and one SD bands to determine the thresholds for transitioning to sustained capital inflow episodes. For instance, the change in capital flows into Chile exceeds the one SD band in the last quarter of 2007 and 2011 and the first quarter of 2018. Because these inflow episodes last at least three quarters, they fit our definition of sustained capital inflow episodes. These episodes begin when the solid line exceeds the one deviation band and end when it goes below the 0.5 SD band.
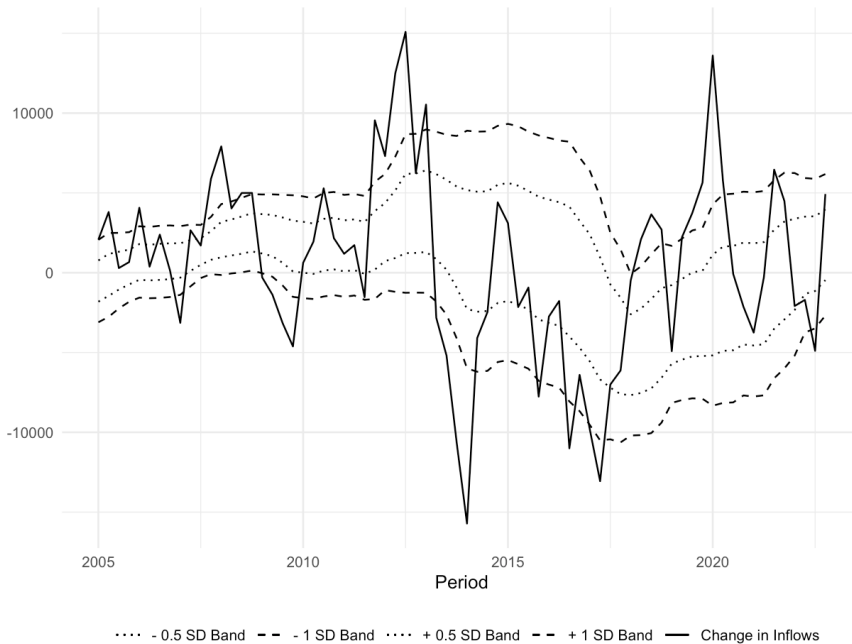
Figure 3: Sustained Inflow Episodes for Chile

Source: Own elaboration based on IMF (2023).

The methodology used in this study generates several binary variables that represent sustained capital inflow episodes. These episodes are represented as $episode_{xq}$, where x refers to the type of flow, and q refers to the minimum number of quarters that the inflow episode continues. For instance, $q=4$ indicates episodes that last at least one year. As shown above, three types of flows are examined, and 'xs are enumerated according to the following course: 1) PI, 2) OI, and 3) FDI.

Table 1 presents the number of quarters for sustained capital inflow episodes created for each $episode_{xq}$. The values that q takes are 3, 4, and 5; because the interest is on episodes that last at least three quarters, and very few episodes in the data set last more than five quarters. The number of episodes does not considerably vary across types of flows. Based on the existing methodology, about 30% of quarters properly take the value 1 since they are part of a sustained capital inflow episode that lasts at least three quarters. The number of ones gradually decreases as q increases because tightening the criterion by increasing q lowers the probability of being an episode.

Table 1: The number of sustained capital inflow episodes

$x \rightarrow$	Portfolio Investment			Other Investment			Foreign Direct Investment		
$q \rightarrow$	3	4	5	3	4	5	3	4	5
	252	210	130	285	261	145	270	246	162

3.3. Explanatory Variables

A large set of variables that controls several country-specific and global effects on capital inflows to EMs are utilized. GDP for each country represents domestic economic activities. One-lagged GDP values are also used to control for any reverse causality effects. Real interest rates are measured by the difference between the nominal interest rate and the annual inflation rate in quarter t, where the proxy for the nominal interest rate is 2-year government bond yields. Missing nominal interest rates are filled by shorter-or longer-term yields in proportional order.

The value of emerging market currencies is controlled by the consumer price index (CPI) based real effective exchange rate (REER). In the analysis, the rolling SD of inflation and the nominal exchange rates for the preceding two years are used to measure inflation rate and exchange rate volatilities. The external debt-GDP ratio is used as an indicator of the countries' indebtedness. CDS for 5-year government bonds of countries are employed to represent country-specific risks, and 3-month averages of daily CDS values are taken to incorporate them into the quarterly data set.

In addition to the country-specific (pull) factors, a set of variables representing global dynamics that affect capital flows to EMs (push factors) are used. For this purpose, the average GDP growth in the Euro Area, United Kingdom (UK), and the US is used as the global growth rate. The averages of the real interest rates of Germany, France, Italy, the UK, and the US are calculated as the world interest rate. Finally, the S&P 100 volatility index (VIX) is used as the global risk measure.

To get the approximate growth rates of the variables and to identify the effects of changes in explanatory variables on sustained capital inflow episodes, domestic and world GDP, REER, foreign exchange rate volatility, inflation volatility, CDS, and VIX are used in their log-first-differences. Interest rates and debt-to-GDP ratio are used in the models in their first differences. [1] GDP, REER, exchange rates, and CPI data are drawn from the IFS. Interest rates, external debt, and CDS series are received from Refinitiv-Eikon Datastream. Finally, VIX data is extracted from investing.com.

3.4 Empirical Framework

Sustained capital inflow episodes are constructed as a binary variable, and the complementary logarithmic framework is used as the estimation methodology. In binary response variable frameworks, complementary log-log models are generally used when one of the binary dependent variables is rare relative to the other. This is because, while logit and probit functions are symmetric around zero, the complementary log-log function is asymmetric around zero. Because the density of ones (i.e., the sustained capital inflow episodes) in the model varies between 15% and 33% across different durations (3, 4, or 5) of episodes, the complementary log-log model is appropriate for the empirical analysis used in this study.

To find the determinants of sustained capital inflow episodes, the following model is formed:

$$Prob\big(episode_{xq_{nt}} = 1\big) = \boldsymbol{\theta}_{n,t}^{Pull}\boldsymbol{\beta}_{pull} + \boldsymbol{\theta}_{t}^{Push}\boldsymbol{\beta}_{push} \tag{3}$$

where $episode_{xq_{nt}}$ is a dummy variable that takes the value 1 if country n is in a sustained capital inflow episode in quarter t. As aforementioned, x is the type of capital flow, and q is the minimum number of quarters representing the episode. $\boldsymbol{\theta}_{n,t}^{Pull}$ is a vector of pull factors, and it includes the domestic GDP growth and its first lag, domestic real interest rate, real effective exchange rate, foreign exchange rate volatility, inflation volatility, external debt to GDP ratio, and the CDS. $\boldsymbol{\theta}_{t}^{Push}$ is a vector of push factors, which composes global GDP growth, the world real interest rate, and the VIX.

Since the effects of the lagged values of pull and push factors on determining sustained capital flow episodes are crucial, the same specification with the baseline model is also set up by using the lagged values of the explanatory variables:

$$Prob\big(episode_{xq_{nt}} = 1\big) = \boldsymbol{\theta}_{n,t-1}^{Pull}\boldsymbol{\eta}_{pull} + \boldsymbol{\theta}_{t-1}^{Push}\boldsymbol{\eta}_{push} \tag{4}$$

---

[1]   Table A.4 in the Appendix presents the results of unit root tests for each variable.

4. Estimation Results

This section presents the estimation results of the models established based on equations 3 and 4 for different q values of $episode_{xq}$. Tables 2-4 present the baseline results of the study. Domestic GDP is statistically significant in OI and for FDI with 5 quarter episodes. GDP with one lag is significant in all types of capital flows. This implies that maintaining stable and positive growth would help EMs attract and retain high capital flows. The world GDP is positively associated with OI and FDI, and the coefficients are statistically significant. For FDI, this would be because firms may be willing to expand their businesses to EMs when economic activity in AEs is strong.

The REER is the weighted average of a country's currency in relation to its major trade partners, and changes in REER affect a country's trade competitiveness. Based on this notion, the REER is expected to affect capital flows. However, the variable is not significant in any type of capital flow. Also, FX volatility and inflation volatility are expected to result in lower capital flows, but inflation volatility is insignificant under all specifications. The coefficients of FX volatility are negative for PI, so it has a reducing effect on PI, but it is significant only in two of the six specifications; it is insignificant for OI and FDI.

The coefficients for domestic interest rates are positive but small; they are mostly statistically insignificant for PI and OI. For the FDI, however, it is strongly statistically significant in all episode specifications. This indicates that foreign investors use financing opportunities in the host country; as the interest rates increase, the cost of investment increases, and FDI decreases.

The world interest rate is strongly significant and negatively associated with the PI. This indicates foreign investors seek higher income opportunities in EMs through portfolio investments when the world interest rate is low. However, the coefficients of the world interest rates for OI and FDI are insignificant. The insignificance of FDI coefficients indicates and supports the above argument that foreign investors use the financing opportunities of the host country instead of their domestic financial institutions. This may be because financial institutions may not easily evaluate the financial plans of an investment or collateral in another country.

Debt-to-GDP ratios have positive but small coefficients and are statistically significant in some PI and OI specifications. The positive impact may be due to the higher return opportunities that EMs with high debt ratios offer to PI and OI investors. Debt-to-GDP coefficients are positive and significant in most FDI specifications. This may be due to the incentives highly indebted countries offer to FDI investors.

As a risk measure, the coefficient values of CDS for PI episodes range from – 0.698 to – 1.438, and all are significant. It is straightforward that PI investors tend to avoid investments in more risky countries. Nevertheless, CDS is positively associated with OI episodes. This might be due to the types of instruments classified in this category. Instruments under OI might offer higher returns during risky times, or their returns may be insulated from the overall country risks. CDS is also positively associated with FDI episodes and is significant in three of the six specifications.

Even though CDS is a direct measure of risk in financial markets, turbulence in financial markets may significantly inhibit real economic activities. Therefore, it isn't easy to reconcile the positive effects of CDS in FDI episodes. One explanation may be that when country risk increases, the value of assets in EMs decreases, and foreign investors use this opportunity to buy assets with long-term perspectives.

Lastly, as a risk measure, the volatility in stock markets in AEs (VIX) has mixed signs in PI and OI, and they are not statistically significant. For FDI, the coefficients are positive, but only two are significant; one is at a 5 percent level, and the other is at a 10 percent level. As suggested above, stock market volatility is not expected to be decisive in long-term investment decisions.

Table 2: Estimation Results: Portfolio Investment

Dependent Variable: $episode_{1q}$						
Time →		t			t-1	
q →	3	4	5	3	4	5
Domestic GDP	1.292 (1.466)	2.415 (1.674)	-0.043 (2.009)	1.780 (1.321)	2.253 (1.583)	0.714 (2.303)
Domestic GDP (-1)	2.652** (1.241)	2.606** (1.318)	0.931 (1.023)	3.925*** (1.407)	3.098*** (1.010)	1.161 (0.926)
Domestic Int. Rate	-0.037** (0.010)	0.043 (0.034)	0.036 (0.045)	0.005 (0.018)	0.047 (0.035)	0.016 (0.040)
REER	-1.229 (2.985)	1.289 (1.991)	-1.407 (2.622)	0.872 (2.174)	1.673 (1.788)	-1.327 (2.614)
FX Volatility	-0.299 (0.414)	0.014 (0.478)	-0.702* (0.369)	– 0.245 (0.321)	-0.129 (0.409)	-0.924** (0.362)
Inflation Volatility	-0.211 (0.276)	0.051 (0.314)	0.324 (0.352)	0.164 (0.276)	0.244 (0.244)	0.504** (0.215)
Debt-to-GDP	0.051 (0.040)	0.073* (0.040)	0.049 (0.042)	0.064* (0.035)	0.105*** (0.033)	0.073 (0.048)
CDS	– 0.886** (0.390)	-0.698* (0.385)	-0.873** (0.402)	– 1.438*** (0.402)	-1.427*** (0.514)	-1.404*** (0.446)
VIX	-0.002 (0.188)	0.095 (0.193)	0.011 (0.251)	– 0.087 (0.200)	-0.006 (0.175)	-0.109 (0.252)
World GDP	0.014 (0.039)	0.001 (0.043)	0.029 (0.049)	– 0.027 (0.051)	-0.039 (0.049)	-0.051 (0.058)
World Int. Rate	-0.738*** (0.189)	-0.651*** (0.218)	-0.712*** (0.220)	– 0.669*** (0.241)	-0.685*** (0.251)	-0.812*** (0.265)

Notes: Robust standard errors of each coefficient are represented in parentheses. *t* and *t-1* refer to models estimated with explanatory variables in *t* and *.t-1*. *q* is the minimum length criterion for dependent variables of each model. ***, **, and * refer to 0.01, 0.05, and 0.1 individual significance levels of coefficients.
Source: Own calculations

Table 3: Estimation Results: Other Investment

Dependent Variable: $episode_{2q}$						
Time →		t			$t-1$	
q →	3	4	5	3	4	5
Domestic GDP	4.844**	4.141**	7.455**	4.720*	3.569	7.688**
	(2.147)	(2.055)	(3.184)	(2.536)	(2.429)	(3.088)
Domestic GDP (-1)	3.176***	3.005***	4.433***	4.710***	4.163***	5.491***
	(0.990)	(1.012)	(1.274)	(0.851)	(0.867)	(0.925)
Domestic Int. Rate	0.058	0.067	0.008	0.005	0.069**	0.015
	(0.045)	(0.057)	(0.019)	(0.024)	(0.033)	(0.022)
REER	-2.033	-0.922	-1.892	– 2.781	-0.827	-2.334
	(2.439)	(1.941)	(2.784)	(2.836)	(2.093)	(2.993)
FX Volatility	0.226	0.255	0.379	– 0.537*	-0.437	-0.070
	(0.289)	(0.287)	(0.440)	(0.318)	(0.315)	(0.425)
Inflation Volatility	-0.184	-0.058	-0.713	– 0.039	0.071	-0.525
	(0.355)	(0.386)	(0.526)	(0.310)	(0.343)	(0.421)
Debt-to-GDP	0.048	0.037	0.060**	0.047	0.029	0.037
	(0.032)	(0.030)	(0.029)	(0.036)	(0.035)	(0.031)
CDS	1.008***	0.952***	1.462***	0.775*	0.836**	1.218**
	(0.287)	(0.265)	(0.324)	(0.453)	(0.417)	(0.506)
VIX	0.209	0.312	-0.039	0.031	0.055	0.131
	(0.209)	(0.219)	(0.241)	(0.205)	(0.190)	(0.164)
World GDP	0.093***	0.104***	0.050	0.144***	0.157***	0.080**
	(0.024)	(0.025)	(0.041)	(0.033)	(0.033)	(0.038)
World Int. Rate	-0.213	-0.239	0.092	– 0.188	-0.187	0.103
	(0.162)	(0.172)	(0.301)	(0.192)	(0.206)	(0.386)

Notes: Robust standard errors of each coefficient are represented in parentheses. t and $t-1$ refer to models estimated with explanatory variables in t and $t-1$. q is the minimum length criterion for dependent variables of each model. ***, **, and * refer to 0.01, 0.05, and 0.1 individual significance levels of coefficients.
Source: Own calculations

Table 4: Estimation Results: Foreign Direct Investment

Dependent Variable: $episode_{3q}$						
Time →		t			t-1	
q →	3	4	5	3	4	5
Domestic GDP	0.279	1.254	4.019**	− 0.158	0.734	3.523***
	(1.641)	(1.700)	(1.643)	(0.957)	(1.035)	(1.376)
Domestic GDP (-1)	1.720*	1.968**	3.704***	1.956**	2.006**	3.281***
	(0.903)	(0.995)	(1.144)	(0.814)	(0.857)	(1.020)
Domestic Int. Rate	-0.091***	-0.097***	-0.105***	− 0.057***	-0.062***	-0.077***
	(0.020)	(0.016)	(0.022)	(0.012)	(0.012)	(0.012)
REER	4.638*	3.381	2.256	2.728	1.431	0.535
	(2.548)	(2.727)	(3.439)	(2.713)	(2.390)	(3.146)
FX Volatility	-0.101	0.038	-0.013	− 0.252	-0.258	-0.442
	(0.414)	(0.412)	(0.521)	(0.398)	(0.382)	(0.471)
Inflation Volatility	-0.212	-0.090	0.170	− 0.253	-0.133	0.156
	(0.304)	(0.260)	(0.170)	(0.278)	(0.252)	(0.229)
Debt-to-GDP	0.048**	0.052**	0.076**	0.041	0.044	0.075**
	(0.024)	(0.026)	(0.038)	(0.026)	(0.029)	(0.035)
CDS	0.720**	0.825**	0.852*	0.034	0.167	0.307
	(0.347)	(0.381)	(0.465)	(0.336)	(0.378)	(0.433)
VIX	0.270	0.211	0.172	0.365**	0.369**	0.208
	(0.247)	(0.204)	(0.250)	(0.147)	(0.164)	(0.207)
World GDP	0.077*	0.085*	0.083	0.087**	0.088**	0.105**
	(0.046)	(0.049)	(0.074)	(0.040)	(0.042)	(0.046)
World Int. Rate	0.190	0.241	0.443	− 0.075	-0.070	0.148
	(0.204)	(0.213)	(0.306)	(0.133)	(0.145)	(0.296)

Notes: Robust standard errors of each coefficient are represented in parentheses. t and t-1 refer to models estimated with explanatory variables in t and t-1. q is the minimum length criterion for dependent variables of each model. ***, **, and * refer to 0.01, 0.05, and 0.1 individual significance levels of coefficients.
Source: Own calculations

4.1. Estimation Results for the Subsamples

In addition to the baseline models, the sustained capital inflow episodes in two subsamples are also investigated. The first subsample is between 2005q1 and 2013q4, and the period between 2014q1 to 2022q4 comprises the second subsample. This decomposition divides the sample period into two halves. The first half includes the pre-GFC period and the period until the FED

announced that it would reduce asset purchases. This division is important because there were significant changes in the interest rate policies and investors' risk appetite due to the GFC and monetary policy changes associated with it.

Tables A.1-A.3 in the Appendix present the estimation results of the models in subsamples. Some of the dynamics of sustained capital inflow episodes are similar to the baseline model. For instance, for PI, domestic GDP growth and its one lag are significant neither in the baseline model nor the subsamples. Still, they are significant for OI in the baseline model and in both of the subsamples. Likewise, world GDP has positive coefficients and is mostly significant for FDI; it has the expected positive sign in both subsamples, but they are strongly significant only in the first subsample.

Nevertheless, some of the dynamics of sustained capital inflow episodes vary from the baseline model. For instance, the world interest rate in the baseline model is significant and has the expected negative sign for PI. While the coefficients are still negative in both subsamples, they are strongly significant in the first subsample, and only two of the coefficients are significant in the second subsample.

Likewise, in the baseline model, coefficients of CDS are negative and strongly significant for PI, and they are positive and strongly significant for OI. Nevertheless, while the sign of the coefficients is the same as in the baseline model, CDS coefficients are significant only in the first subsample of PI and OI. This might reflect the investors' changing risk appetite in the second subsample due to the GFC and the policies associated with it. The risk factor for the developed countries, VIX, is mostly insignificant, and they have mixed signs in the baseline model. However, the coefficients are primarily positive and significant for OI and FDI in the second subperiod. This may reflect investors' increasing risk aversion regarding the stock markets in developed countries after the GFC.

Also, while inflation volatility has mixed signs and is not statistically significant for PI in the baseline model, the coefficients have the expected negative sign and are statistically significant in the first subsample. In the second subsample, the coefficients are positive, and they are again statistically significant. This variation may be explained by changing inflation perception of investors due to higher international liquidity in the post-GFC period.

Hence, while some variables are robust in different periods, some effects vary across the two subsamples. Nevertheless, these discrepancies do not pose a problem for the robustness of the model because GFC was a significant economic shock to the world economy and yielded extraordinary economic dynamics, notably to interest rates and investors' risk perceptions. Also, because the sample size decreases by half, from 72 to 36 for each country, when the data is divided into two subsamples, it may be more difficult to get significant coefficients in subsamples.

5. Conclusion

International capital flows across countries have been a significant economic concern since the opportunities for financial transactions across countries started in the 1980s. Foreign capital became an essential source of economic growth and development for EMs in the 1990s. However, volatile and precarious capital flows may erode the benefits for the receiving economies. For instance, a sharp increase in capital flows may harm the competitiveness of the domestic currency, or a sudden reversal may lead to debt payment problems and economic contraction.

The existing literature has focused on various aspects of capital flows, such as the drivers of capital flows, the relationship between the foreign exchange market and capital flows, and the effectiveness of capital controls in mitigating the adverse effects of sharp changes in capital flows. This study contributes to the literature by defining and examining the dynamics of sustained capital inflow episodes to EMs.

The results indicate that some country-specific factors, such as the domestic GDP growth, domestic interest rates, and CDS premium of EMs, and some factors associated with AEs, such as the level of economic activity and the interest rates in developed countries, affect the likelihood of capital flows to EMs. Regarding the country-specific factors, policymakers in EMs should maintain a sound macroeconomic environment and keep macroeconomic variables in balance for sustained capital inflows. While policymakers in EMs cannot influence the level of economic activity or the interest rates in developed countries, they should take preventive measures against fluctuations in economic situations in AEs and rely less on capital inflows to maintain their basic economic activities.

By decomposing the analysis into two subperiods, it is also shown that economic shocks, such as the GFC, and the policies associated with such major economic events may affect the determinants of capital flows. For instance, while inflation volatility is insignificant for PI flows in the baseline model, the coefficients have the expected negative sign in the first subsample and a positive sign in the second subsample. The changing effects of inflation may be due to changing inflation dynamics in the two sample periods due to monetary policies implemented in response to the GFC. Also, while one lag of domestic GDP is found to be significant in the baseline model for all specifications, it is significant in both subsamples only for OI. The results for the baseline model and varying effects due to major economic events imply that maintaining a positive and stable level of economic activity, low interest rates, and a low level of risk may help EMs to attract sustained capital flows and support their growth prospects.

While evaluating the findings, one should consider that the analysis in this study is based on a binary dependent variable that is idiosyncratically defined for a specific purpose and selected emerging market countries in a definite period. The results in this study may differ from alternative models that directly examine changes in inflows or extreme capital flow episodes. Further works may employ the methodology of this study for other country groups and periods.

References

Anaya, P., Hachula, M., & Offermanns, C. J. (2017). Spillovers of US unconventional monetary policy to emerging markets: The role of capital flows. *Journal of International Money and Finance*, 73, 275–295. https://doi.org/10.1016/j.jimonfin.2017.02.008

Baek, I-M. (2006). Portfolio investment flows to Asia and Latin America: Pull, push or market sentiment? *Journal of Asian Economics*, 17(2), 363–373. https://doi.org/10.1016/j.asieco.2006.02.007

Baharumshah, A.Z., and Thanoon, M.A.-M. (2006). Foreign capital flows and economic growth in East Asian countries. *China Economic Review*, 17, 70-83. https://doi.org/10.1016/j.chieco.2005.09.001

Baum, C. F., Pundit, M., & Ramayandi, A. (2017). Capital flows and financial stability in emerging economies. *ADB Economics Working Paper Series* (522).

Blundell-Wignall, A., and Roulet, C. (2014). Problems in the international financial system. *OECD Journal: Financial Market Trends,* 2014 (1).

Calderon, C., and Kubota, M. (2013). Sudden stops: Are global and local investors alike? *Journal of International Economics,* 89(1), 122–142. https://doi.org/10.1016/j.jinteco.2012.05.010

Calvo, G. A. (1998). Capital flows and capital-market crisis: The simple economics of sudden stops. *Journal of Applied Economics*, 1(1), 35-54. https://doi.org/10.1080/15140.326.1998.12040516

Calvo, G. A., Leiderman, L., & Reinhart, C. M. (1993). Capital inflows and real exchange rate appreciation in Latin America: the role of external factors. *IMF Staff Papers*, 40(1), 108–151.

Calvo, G. A., Leiderman, L., & Reinhart, C. M. (1996). Inflows of capital to developing countries in the 1990s. *Journal of Economics Perspectives*, 10(2), 123-139. DOI: 10.1257/jep.10.2.123

Cerutti, E., Claessens, S., & Puy, D. (2019). Push factors and capital flows to emerging markets: why knowing your lender matters more than fundamentals. *Journal of International Economics*, 119, 133–149. https://doi.org/10.1016/j.jinteco.2019.04.006

Chuhan, P., Claessens, S., & Mamingi, N. (1998). Equity and bond flows to Latin America and Asia: the role of global and country factors. *Journal of Development Economics*, 55(2), 439–463. https://doi.org/10.1016/S0304-3878(98)00044-3

Clark, J., Converse, N., Coulibaly, B., & Kamin, S. B. (2020). Emerging market capital flows and US monetary policy. *International Finance*, 23(1), 2–17. https://doi.org/10.1111/infi.12355

Datastream. (2023). Refinitiv-Eikon. Available at: Subscription service. Retrieved April 27, 2023.

Duttagupta, R., & Pazarbasioglu, C. (2021). Miles to go. Finance & Development, International Monetary Fund.

Fernandez-Arias, E. (1996). The new wave of private capital inflows: push or pull? *Journal of Development Economics*, 48(2), 389–418. https://doi.org/10.1016/0304-3878(95)00041-0

Forbes, K. J., & Warnock, F. E. (2012). Capital flow waves: Surges, stops, flight, and retrenchment. *Journal of International Economics*, 88(2), 235–251. https://doi.org/10.1016/j.jinteco.2012.03.006

Fratzscher, M. (2012). Capital flows, push versus pull factors, and the global financial crisis. *Journal of International Economics*, 88(2), 341–356. https://doi.org/10.1016/j.jinteco.2012.05.003

Frost, J., Ito, H., & Van Stralen, R. (2020). The effectiveness of macroprudential policies and capital controls against volatile capital inflows. *DNB Working Paper* (686).

Hlaing, S. W., & Kakinaka, M. (2019). Global uncertainty and capital flows: any difference between foreign direct investment and portfolio investment? *Applied Economics Letters*, 26(3), 202–209. https://doi.org/10.1080/13504.851.2018.1458182

IMF. (2023). International Financial Statistics. Retrieved April 10, 2023 from https://data.imf.org/?sk=4c514d48-b6ba-49ed-8ab9-52b0c1a0179b

Investing.com. (2023). CBOE Volatility Index (VIX). Retrieved April, 21, 2023 from https://tr.investing.com/indices/volatility-s-p-500

Kim, Y. (2000). Causes of capital flows in developing countries. *Journal of International Money and Finance*, 19(2), 235–253. https://doi.org/10.1016/S0261-5606(00)00001-2

Lim, J. J., Mohapatra, S., & Stocker, M. (2014). Tinker, taper, QE, bye? the effect of quantitative easing on financial flows to developing countries. *World Bank Policy Research Working Paper* (6820).

Norring, A. (2022). Taming the tides of capital – review of capital controls and macroprudential policy in emerging economies. *Bank of Finland Economics Review*.

Nugent, R. J. (2019). Restrictions on short-term capital inflows and the response of direct investment. *Eastern Economic Journal*, 45(3), 350–383.

Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics,* 22(2), 265-312. https://doi.org/10.1002/jae.951

Pesaran, M. H. (2021). General diagnostic tests for cross-section dependence in panels. *Empirical Economics,* 60 (1), 13-50. https://doi.org/10.1007/s00181.020.01875-7

Sui, Q.-Y. (2019). China's economic growth and international capital flows. *Public Policy Review*, 15(1), 121-149.

Turner, P. (1991). Capital flows in the 1980s: A survey of major trends. *BIS Economics Papers,* 30.

UNCTAD (2017). Global Investments Trend Monitor, No 25. 1 February 2017.

Table A.1: Estimation Results of Subsamples: Portfolio Investment

Dependent Variable: $episode_{iq}$

Samples →	Subsample 1						Subsample 2					
Time →	t			$t\text{-}1$			t			$episode_{3q}$		
q →	3	4	5	3	4	5	3	4	5	3	4	5
Domestic GDP	-0.189 (2.372)	0.132 (2.470)	2.778 (1.862)	-0.321 (2.478)	-0.857 (2.640)	3.101 (2.418)	-1.194 (3.219)	1.262 (2.471)	0.248 (2.621)	2.690 (3.124)	4.787 (3.009)	3.647 (2.899)
Domestic GDP (-1)	1.130 (2.248)	1.865 (2.293)	3.502** (1.405)	5.064** (2.557)	5.038* (2.644)	4.391 (2.793)	2.183 (1.391)	2.394 (1.863)	1.450 (1.801)	2.112 (1.611)	1.126 (0.902)	1.193 (0.889)
Domestic Int. Rate	-0.013 (0.024)	0.136* (0.076)	0.176* (0.094)	0.025 (0.028)	0.116* (0.070)	0.055 (0.038)	-0.010 (0.054)	0.028 (0.073)	0.022 (0.074)	0.049 (0.058)	0.044 (0.063)	0.040 (0.064)
REER	3.767 (3.542)	6.622* (3.929)	4.892 (5.307)	4.775 (4.120)	6.152 (4.416)	2.427 (4.915)	-5.331 (3.731)	-3.186 (3.812)	-3.673 (4.188)	-1.853 (3.713)	-2.989 (4.269)	-2.144 (3.690)
FX Volatility	-0.349 (0.572)	-1.965*** (0.359)	0.061 (0.724)	-0.394 (0.427)	-0.093 (0.574)	-2.011*** (0.417)	-0.374 (0.396)	-0.181 (0.414)	-0.335 (0.465)	-0.039 (0.412)	-0.221 (0.461)	-0.419 (0.533)
Inflation Volatility	-0.894** (0.429)	-0.882* (0.493)	-1.170* (0.675)	-0.463 (0.581)	-0.739 (0.510)	-0.786 (0.810)	0.778** (0.326)	1.255*** (0.401)	1.029** (0.452)	0.809** (0.374)	1.118** (0.457)	0.955** (0.429)
Debt-to-GDP	-0.023 (0.029)	0.045 (0.029)	0.046 (0.058)	0.034 (0.036)	0.085*** (0.024)	0.095* (0.055)	0.043 (0.047)	0.030 (0.056)	0.024 (0.058)	0.060 (0.088)	0.091 (0.092)	0.094 (0.090)
CDS	-0.725* (0.396)	-0.846** (0.409)	-0.890 (0.660)	-1.442*** (0.513)	-1.592*** (0.596)	-1.516* (0.921)	-1.705* (0.935)	-0.811 (0.957)	-0.775 (1.001)	-1.860** (0.871)	-1.359 (0.886)	-1.225 (0.907)
VIX	0.280 (0.319)	0.360 (0.386)	-0.338 (0.687)	0.113 (0.324)	0.010 (0.352)	-0.894 (0.831)	-0.077 (0.289)	0.045 (0.376)	0.070 (0.364)	-0.179 (0.308)	0.050 (0.316)	0.144 (0.300)
World GDP	0.666 (0.444)	0.532 (0.412)	0.393 (0.476)	0.227 (0.259)	0.129 (0.228)	0.001 (0.592)	0.015 (0.042)	0.026 (0.038)	0.028 (0.039)	-0.077 (0.062)	-0.075 (0.061)	-0.087 (0.056)
World Int. Rate	-0.856*** (0.186)	-0.882*** (0.185)	-1.108*** (0.247)	-0.661*** (0.191)	-0.732*** (0.186)	-0.869*** (0.212)	-0.682 (0.421)	-0.363 (0.574)	-0.261 (0.638)	-0.910* (0.529)	-0.835* (0.644)	-0.817 (0.691)

Notes: Robust standard errors of each coefficient are represented in parentheses. t and $t\text{-}1$ refer to models that are estimated with explanatory variables in t and $t\text{-}1$. q is the minimum length criterion for dependent variables of each model. Subsample 1 focuses on the period between 2005 and 2013, where the remaining part constitutes subsample 2. ***, **, and * refer to 0.01, 0.05, and 0.1 individual significance levels of coefficients.
Source: Own calculations

Table A.2: Estimation Results of Subsamples: Other Investment

Dependent Variable: $episode_{iq}$

Samples →	Subsample 1						Subsample 2					
Time →	t			t-1			t			t-1		
q →	3	4	5	3	4	5	3	4	5	3	4	5
Domestic GDP	7.639***	7.744***	9.521***	8.243***	7.175***	8.813**	1.007	1.382	-0.517	1.337	1.639	2.415
	(1.983)	(2.117)	(2.901)	(2.508)	(2.737)	(3.941)	(3.326)	(3.440)	(4.699)	(3.391)	(3.551)	(3.583)
Domestic GDP (-1)	4.190***	4.174***	5.034***	6.231***	4.989***	5.971***	1.474*	1.690**	1.484	2.261***	2.261***	1.786
	(1.441)	(1.513)	(1.880)	(1.410)	(1.218)	(1.657)	(0.757)	(0.729)	(1.290)	(0.747)	(0.771)	(1.153)
Domestic Int. Rate	0.113	0.137*	0.056	-0.009	0.107	0.023	0.031	0.042	-0.044	0.047	0.063	0.021
	(0.071)	(0.073)	(0.053)	(0.029)	(0.066)	(0.040)	(0.063)	(0.067)	(0.055)	(0.056)	(0.052)	(0.048)
REER	-1.423	-0.568	-3.142	-1.977	1.476	-1.116	-2.379	-1.486	0.124	-4.629	-3.189	-5.954
	(3.351)	(3.352)	(3.512)	(3.736)	(3.625)	(4.167)	(2.135)	(2.377)	(3.280)	(3.182)	(3.965)	(4.487)
FX Volatility	-0.090	-0.122	-0.153	-0.560	-0.633	-0.464	0.521	0.547	1.406	-0.889**	-0.678**	0.338
	(0.407)	(0.517)	(0.646)	(0.424)	(0.545)	(0.752)	(0.493)	(0.433)	(0.888)	(0.439)	(0.332)	(0.718)
Inflation Volatility	-0.286	-0.296	-0.692	0.236	0.198	-0.202	-0.277	-0.103	-0.914	-0.245	-0.182	-1.001
	(0.407)	(0.477)	(0.546)	(0.427)	(0.441)	(0.496)	(0.372)	(0.355)	(0.972)	(0.352)	(0.356)	(0.965)
Debt-to-GDP	0.040*	0.019	0.051**	0.046	-0.001	0.019	0.034	0.039	0.048	0.051	0.061	0.012
	(0.022)	(0.025)	(0.025)	(0.048)	(0.030)	(0.041)	(0.054)	(0.056)	(0.053)	(0.045)	(0.051)	(0.024)
CDS	1.773***	1.784***	1.521***	1.229**	1.511***	1.237**	0.459	0.454	-0.152	0.375	0.419	0.049
	(0.301)	(0.274)	(0.327)	(0.582)	(0.547)	(0.524)	(0.556)	(0.584)	(0.542)	(0.550)	(0.569)	(0.589)
VIX	-0.200	-0.002	0.164	0.021	0.118	0.263	0.496**	0.520**	0.048	-0.014	-0.031	0.068
	(0.340)	(0.322)	(0.402)	(0.439)	(0.401)	(0.369)	(0.234)	(0.266)	(0.332)	(0.198)	(0.209)	(0.206)
World GDP	0.599	0.544	0.365	1.370***	1.375***	1.276**	0.065	0.064	0.058	0.087*	0.083*	0.009
	(0.367)	(0.363)	(0.400)	(0.414)	(0.442)	(0.549)	(0.044)	(0.045)	(0.080)	(0.047)	(0.050)	(0.080)
World Int. Rate	0.041	0.095	0.123	-0.170	-0.019	-0.016	-0.582*	-0.605*	-0.359	-0.423	-0.510	-0.419
	(0.215)	(0.263)	(0.241)	(0.242)	(0.272)	(0.279)	(0.351)	(0.347)	(0.703)	(0.382)	(0.372)	(0.844)

Notes: Robust standard errors of each coefficient are represented in parentheses. t and t-1 refer to models estimated with explanatory variables in t and t-1. q is the minimum length criterion for dependent variables of each model. Subsample 1 focuses on the period between 2005 and 2013, where the remaining part constitutes subsample 2. ***, **, and * refer to 0.01, 0.05, and 0.1 individual significance levels of coefficients.
Source: Own calculations

Table A.3: Estimation Results of Subsamples: Foreign Direct Investment.

Dependent Variable: $episode_{3t}$

Samples →	Subsample 1						Subsample 2					
Time →	t			t-1			t			t-1		
q →	3	4	5	3	4	5	3	4	5	3	4	5
Domestic GDP	-0.066	-0.198	-0.211	-0.829	-1.041	-1.441	-0.378	0.617	7.462*	-0.666	0.287	6.412*
	(2.443)	(2.477)	(3.058)	(2.249)	(2.259)	(2.893)	(3.627)	(3.824)	(4.397)	(2.574)	(2.820)	(3.342)
Domestic GDP (-1)	-1.326	-1.594	-1.741	-2.985**	-3.221***	-4.363**	1.437	1.685	3.572**	1.807	1.669	3.676**
	(1.531)	(1.574)	(2.078)	(1.230)	(1.218)	(1.742)	(1.427)	(1.669)	(1.813)	(1.257)	(1.342)	(1.735)
Domestic Int. Rate	-0.136*	-0.145*	-0.118**	-0.078***	-0.084***	-0.096**	-0.056	-0.051	-0.059	-0.031	-0.023	-0.004
	(0.079)	(0.080)	(0.050)	(0.025)	(0.030)	(0.043)	(0.048)	(0.060)	(0.089)	(0.026)	(0.040)	(0.060)
REER	2.400	2.378	3.052	0.230	0.134	0.378	7.587*	6.130	4.747	5.670	4.155	3.716
	(3.143)	(3.110)	(4.062)	(3.971)	(3.969)	(5.063)	(4.395)	(5.084)	(6.632)	(4.171)	(4.047)	(5.676)
FX Volatility	0.072	0.171	0.137	-0.142	-0.069	-0.237	0.008	0.214	0.295	0.182	0.034	-0.064
	(0.592)	(0.561)	(0.754)	(0.540)	(0.523)	(0.672)	(0.631)	(0.723)	(0.991)	(0.694)	(0.724)	(0.897)
Inflation Volatility	-0.037	0.001	0.036	0.135	0.131	0.027	-0.464	-0.207	0.468	-0.660	-0.431	0.451
	(0.336)	(0.352)	(0.409)	(0.406)	(0.416)	(0.479)	(0.493)	(0.493)	(0.634)	(0.423)	(0.453)	(0.602)
Debt-to-GDP	0.047	0.048	0.067	0.015	0.014	0.044	0.063*	0.073*	0.140**	0.068**	0.084***	0.148***
	(0.031)	(0.032)	(0.056)	(0.040)	(0.042)	(0.078)	(0.038)	(0.039)	(0.064)	(0.027)	(0.031)	(0.023)
CDS	0.869*	0.859*	0.496	0.264	0.285	-0.072	1.465*	1.635*	3.127**	-0.029	0.413	1.686
	(0.449)	(0.461)	(0.397)	(0.496)	(0.514)	(0.405)	(0.878)	(0.947)	(1.457)	(0.937)	(0.960)	(1.365)
VIX	0.053	0.149	0.443	0.361	0.350	0.486	0.526**	0.442**	0.164	0.547***	0.627***	0.434
	(0.484)	(0.464)	(0.424)	(0.321)	(0.318)	(0.322)	(0.257)	(0.179)	(0.247)	(0.141)	(0.183)	(0.417)
World GDP	0.746***	0.770***	0.947***	0.981***	1.005***	1.177***	0.053	0.071	0.016	0.031	0.046	0.071
	(0.190)	(0.191)	(0.328)	(0.206)	(0.210)	(0.382)	(0.069)	(0.084)	(0.141)	(0.063)	(0.078)	(0.091)
World Int. Rate	0.433*	0.440	0.699*	0.149	0.149	0.382	-0.312	-0.302	-0.579	-0.717*	-0.798*	-0.854
	(0.263)	(0.273)	(0.396)	(0.212)	(0.220)	(0.336)	(0.331)	(0.397)	(0.717)	(0.377)	(0.441)	(0.836)

Notes: Robust standard errors of each coefficient are represented in parentheses. t and $t-1$ refer to models that are estimated with explanatory variables in t and $t-1$. q is the minimum length criterion for dependent variables of each model. Subsample 1 focuses on the period between 2005 and 2013, where the remaining part constitutes subsample 2. ***, **, and * refer to 0.01, 0.05, and 0.1 individual significance levels of coefficients.
Source: Own calculations

Table A.4: Cross-Sectional Dependence and Unit Root Tests

	CSD Test		Unit Root Tests		
Variables in →	Level	Level	Log-Difference	Level	Log-Difference
	CD Test	CADF Test	CADF Test	ADF Test	ADF Test
Domestic GDP	49.42	-1.313	-6.086		
	(0.000)	(0.962)	(0.000)		
Domestic Int. Rate	17.09	-2.145	-6.098		
	(0.000)	(0.083)	(0.000)		
REER	12.99	-2.509	-6.038		
	(0.000)	(0.003)	(0.000)		
FX Volatility	15.62	-1.026	-5.730		
	(0.000)	(0.998)	(0.000)		
Inflation Volatility	18.99	-1.724	-5.355		
	(0.000)	(0.584)	(0.000)		
Debt-to-GDP	16.51	-1.786	-6.055		
	(0.000)	(0.490)	(0.000)		
CDS	32.44	-2.272	-6.070		
	(0.000)	(0.031)	(0.000)		
VIX	68.93			-3.670	-10.824
	(0.000)			(0.004)	(0.000)
World GDP	68.93			1.331	-9.530
	(0.000)			(0.996)	(0.000)
World Int. Rate	68.93			0.488	-5.309
	(0.000)			(0.984)	(0.000)

Critical values for the CADF are 2.420, – 2.250, and – 2.150, respectively, for 1%, 5%, and 10% significance levels. The null hypothesis assumes that all series are non-stationary. For the ADF Test, critical values for 1%, 5%, and 10% are respectively – 3.551, – 2.913, and – 2.592. The null hypothesis of this test is that the variable contains a unit root.

Table A.4 presents the results of cross-sectional dependence (CSD) and unit root tests for each variable. We utilize the Pesaran (2021) CD-Test to assess cross-section independence. As the null hypothesis of cross-section independence is rejected across all variables, we proceed with the Pesaran (2007) unit root test, appropriate in the presence of cross-sectional dependence. Also, for cross-sectionally invariant variables, we employ the Augmented Dickey-Fuller unit root test. The findings reveal that, except for REER and VIX, all variables are non-stationary at the 1% significance level when examined at their level, yet they demonstrate stationarity when analyzed through their log differences.

RESEARCH ARTICLE

THE EFFECT OF THE EXISTENCE OF CHIEF RISK OFFICER (CRO) ON BANK PERFORMANCE

Ayşe Nur GÜNGÖR BOSTAN[*] ID

Aslı AYBARS[**] ID

Abstract

Over the past few years, numerous studies have examined how top management affects financial performance. These studies highlight the significance of management teams' characteristics and qualities as key factors influencing firms' financial performance. This study focuses on the growing prevalence of Chief Risk Officers (CROs) in the banking industry. It aims to investigate the impact of CROs on the financial performance of banks in the North American Bank sample. The primary objective of this paper is to address the existing gap in the literature by exploring whether there are performance differences between banks that employ CROs and those that do not. This study is based on panel data methodology and the findings of this study provide evidence of a positive correlation between bank size and the presence of a CRO. However, no significant relationship is found between the existence of a CRO and stock return volatility or bank profitability. It is observed that banks with higher volatility levels tend to hire CROs as part of their management team. Consequently, the results suggest that riskier banks are more inclined to employ CROs compared to their safer counterparts.

Keywords: Chief risk officer (CRO), performance, bank, panel data analysis.

JEL Classification: G21, G32, G34

1. Introduction

The most recent financial crisis severely impacted banking industry. Therefore, interest in enterprise risk management grew significantly in recent years (Liebenberg and Hoyt, 2003). For banks to maintain a sustainable financial structure, focusing on risk management became crucial. Especially, banks face many risks such as credit risk, currency risk, etc. Hiring a risk officer is a major indication for a firm about management's perception towards risk. The top management team's effect on firm performance became a theory with upper echelons perspective. The upper echelon theory was developed by Hambrick and Mason in 1984. The theory states that organizational outcomes, strategic choices, and performance levels are partially predicted

---

[*]   Marmara University, Faculty of Business Administration, PhD Candidate, E-mail: aysenurbostan@marun.edu.tr, ORCID: 0009-0008-8972-3040

[**]   Marmara University, Faculty of Business Administration, E-mail: asli.aybars@marmara.edu.tr, ORCID: 0000-0002-7899-2367

by managerial background characteristics. Accordingly, this study focuses on many hypotheses about top management team's effects on performance. In terms of upper echelon point of view, many studies have been conducted and also different hypotheses have been developed. For example, King et al., (2016) published a paper which is about the influence of CEO education on bank performance and they found that management education delivers skills enabling CEOs to manage increasingly larger and complex banks and achieve successful performance outcomes. Hamid Mehran (1995) published a paper which investigated whether firm performance affected by compensations and the study finds that firm performance is positively related to the percentage of equity held by managers and to the percentage of their compensation that is equity based.

The study by Fahlenbrach and Stulz (2011) about bank CEO incentives and the credit crisis, investigated whether bank performance during the credit crisis is related to chief executive officer incentives before the crisis. In recent years, the concept of CROs managing risk management activities has gained importance. Colquitt et al. (1999) conducted a survey among firms listed in Business Insurance Risk Management Services to evaluate the characteristics and extent of integrated risk management. Their survey revealed that 6.6 percent of these firms reported having an individual with the title of 'Chief Risk Officer' within the company. The results also refer to the traditional risk management concept and according to this, the managers who are responsible for risk management are not given a board level title. The results of this study point out that the respondents' answers suggest the trend toward risk management integration continues. More traditional way of managing risk turned to enterprise risk management (ERM) concept and ERM calls for high level oversight of a company's entire risk portfolio rather than for many different overseers managing specific risks. Furthermore, ERM centralizes management under a CRO or ERM committee who manages the individual overseers to help identify overall how much risk the entity can tolerate, assess mitigation tactics and otherwise take advantages of risk opportunities (Banham, 2005). The role of Chief Risk Officer has begun to gain worldwide acceptance and momentum, a trend that began in the U.S. financial services industry and has extended into Europe and Asia as well as other industries such as energy and non-financial corporations (Lam, 2001). Under the rules issued after crises, the biggest U.S. bank-holding companies are required to have a CRO and a risk committee on the company's board of directors (Sterngold, 2014). There is also evidence that managers in firms with CROs overseeing ERM programs felt more confidence in the efficacy of their risk management system (Pernell et al., 2017). According to Deloitte survey results, assigning an individual executive responsibility for ERM is positively correlated with the level of preparedness to manage risk (Deloitte 2008:15). In recent years, however, corporate risk management has expanded well beyond insurance and hedging of financial exposures to include other kinds of risks such as operational risk, reputational risk, and most recently strategic risk so that the risk management function is now directed often by a senior executive with the title of Chief Risk Officer (CRO) (Nocco and Stulz, 2006). In the related literature, the studies which focus on firm performance in the view of enterprise risk management are common. According to Cumming and Hirtle (2001), Lam (2001), and Meulbroek (2002); enterprice risk management benefits firms by decreasing earnings and stock price volatility, reducing external capital costs, increasing capital

efficiency, and creating synergies between different risk management activities. Baxter et al. (2012) focusing on the global financial crisis, suggest that there is no relation between ERM quality and market performance prior to and during the market collapse. Grace et al. (2015) examine risk management practices in the insurance industry and they find that insurance company with CRO, dedicated risk committees, and risk management entities that report to Chief Financial Officers experience higher cost efficiency and return on assets. Quon et al. (2012) examine enterprise risk management and firm performance on non-financial firms in their paper. According to findings of this study, the assessed levels of economic or market risk exposure or consequences are not related to firm performance. Smithson and Simkins (2005) examine an empirical study on risk management and the value of the firm. Their findings show that the evidences about risk management increasing firm value are fairly limited. Beasley et al. (2008) examine equity market reactions to announcement of appointments of senior executive officers.

The literature related with risk management activities for banks is another hot and contemporary topic. The existence of a Chief Risk Officer (CRO) has the potential to significantly improve bank performance. A CRO is responsible for setting, monitoring, and managing risk levels and policies within a bank. This includes managing risk associated with credit, liquidity, market, operational, and other risks. By having a dedicated individual to oversee risk management, banks can more effectively identify and manage risk. CROs also ensure that banks are compliant with regulatory requirements and internal policies. This helps to provide a more secure environment for customers and investors, which can lead to increased confidence in the bank. In addition, CROs can identify potential risks and develop strategies to mitigate them. This can help to prevent potential disasters such as financial crises, which can lead to significant losses for a bank. Overall, the presence of a CRO can help to improve the performance of a bank by providing better risk management and compliance practices. This can lead to increased confidence in the bank, better risk management, and improved performance. For instance, Fahlenbrach and Stulz (2011) investigate the role of risk management in risk reduction. In another study performed by Bailey (2019), it has been found that expertise in the CRO role is particularly important during the financial crisis. According to the findings of Pernell et al. (2017), when banks hire CRO in their upper management team; the usage of risky derivatives are significantly increased to maximize profitability. Another significant finding is revealed by Bailey (2019), and this paper examines insurance companies and finds that if CRO has expertise in a prior high-level risk management role, the contribution of the firm's profitability is positively significant. According to the findings about risk management in insurance companies in the study of Liebenberg and Hoyt (2003); it is suggested that enterprise risk management can be used to increase the value of insurance companies. Lundqvist and Vilhelmsson (2018) investigate the relationship between the degree of Enterprise Risk Management (ERM) and default risk in a panel dataset covering 78 of the world's largest banks and ERM implementation is not found to be a significant determinant of credit ratings that represent default risk and financial ratios according to their findings. Pagach and Warr (2010) study on a dataset of 106 U.S. firms, which are mostly financial firms and announce hiring a CRO. They find that some firms hiring CRO experience a reduction in earnings volatility

but in general they find weak impact of CRO on a wide range of firm variables. These results are consistent with our study's findings that will be revealed in the forthcoming sections.

As far as the literature review is concerned, no study has been found investigating the effect of hiring CRO on the bank performance. Accordingly, in this study, the effect of CRO hiring on bank performance will be investigated on the data set of Compustat North America and Execucomp which are merged for the period between 1992-2014. The paper proceeds as follows. In Section 2, the sample of banks will be introduced. In Section 3, hypothesis and variables will be explained. In Section 4, the descriptive statistics and results of the analysis will be presented. Section 6 is devoted to the conclusion and discussion of the results.

2. Sample Selection

This study utilizes data extracted from Execucomp database regarding management team properties. Execucomp database is used as the starting point of the sample. Also, Compustat North America database is used for extracting the financials of banks. Accordingly, Execucomp and Compustat databases are merged in this study. Period of Execucomp database is starting from 1992 until 2014. So, the period of the data downloaded from Compustat database is chosen to cover the years between 1992-2014 to comply with Execucomp database. The sample is restricted as to comply with the paper of Fahlenbrach and Stulz (2011) that focuses on Bank CEO incentives and credit crisis. Firm-year observations for firms are downloaded by using Standard Industry Classfication (SIC) codes between 6000 and 6300 for the period of 1992 and 2014. The firms with SIC code 6282 (Investment Advice) are excluded, because these are not in the lending business. The initial sample has 2,989 bank-year observations and is based on a total of 340 banks. After missing variables are excluded from the sample, the final sample comprises 1,575 bank-year observations belonging to 186 banks.

The variables related to non-interest income and deposits are not in the Compustat database so these variables are extracted from Compustat-Bank database. Bank size, equity capital, charter value, and retained earnings variables are generated from Compustat database. Volatility variable is taken from CRSP database. Variables with respect to macroeconomic conditions are taken from Federal Reserve Bank of Philadelphia website and merged into the main sample.

In Table 1, the number of observations is demonstrated by years. The total number of observations is 1,575 and 406 of them represent the existence of CRO in the banks. So, 74.22% of total observations do not have a CRO with the remaining 25.78% of the observations having a CRO.

Table 1: Number of Observations by Year

Years	Without CRO	With CRO	CRO %	Total
1994	6	0	0	6
1995	18	0	0	18
1996	15	1	6.3	16
1997	11	1	8.3	12
1998	19	2	9.5	21
1999	67	14	17.3	81
2000	68	16	19.0	84
2001	73	14	16.1	87
2002	70	16	18.6	86
2003	70	19	21.3	89
2004	67	20	23.0	87
2005	67	17	20.2	84
2006	73	16	18.0	89
2007	74	25	25.3	99
2008	82	31	27.4	113
2009	73	32	30.5	105
2010	69	34	33.0	103
2011	66	32	32.7	98
2012	62	37	37.4	99
2013	59	41	41.0	100
2014	60	38	38.8	98
Total	**1,169**	**406**		**1,575**
Percentage	**74.22%**	**25.78%**		

3. Hypothesis Development

This study's hypothesis centers on the impact of a Chief Risk Officer (CRO) on bank performance. We utilize Return on Assets (ROA), a metric that represents bank profitability, as our primary measure. ROA is calculated as the ratio of net income to the total book value of assets. In defining control variables, we follow the framework established by King et al. (2016), who investigated the effects of CEO education on bank performance. The hypothesis of our study is formulated as follows:

H1: *Existence of CRO in the bank is positively associated with higher performance.*

Accordingly, ROA represents performance criteria as the dependent variable. Additionally, selected control variables that take into year effect is utilized in the econometric model so that the model is displayed as below;

$$Bank\ Performance_{i,t+1} = \beta_0 + \beta_1 CRO_t + \beta_2 Controls_t + Year_t + \varepsilon_{i,t} \qquad (1)$$

5

In the model 1 above, CRO is designed as dummy variable. If the bank hires a CRO, the variable is described as 1 and if not described as 0.

We follow King et al. (2016) in choosing our control variables that include; bank size, equity capital, charter value, deposits, volatility, non-interest income, retained earnings, and macroeconomic conditions. The aforementioned study focuses on a specific trait of management team such that the link between CEO education and bank performance is examined. Our study focuses on the relationship between upper management team that is directed by CRO and bank performance. The details of control variables are demonstrated in Appendix 1.

4. Descriptive Statistics and Regression Results

a. Descriptive Statistics

This paper's primary measure of firm performance as a proxy for bank profitability is defined as bank ROA and as consistent with the study of King et. al. (2016), industry adjusted ROA is created, which is defined as a bank's ROA minus the mean ROA of all other banks on a per annum basis. Prior studies have shown that differences in bank size may have a positive impact on profitability due to economies of scale (Westman, 2011). A more complicated management structure, with an increasing number of managerial layers, may reduce the efficiency of large banks (Williamson, 1967). So, in this study, Bank size (natural logarithm of total assets), Equity capital (fraction of equity to total assets) and Charter value (logarithm of market to book value of equity) are utilized as control variables. According to Demirgüç-Kunt and Huizinga (2010), in response to banking deregulation as described earlier, banks are increasingly relying on non-traditional sources of income to improve profit margin and diversify risk. In line with the study of King et al. (2016); non-interest income, which is measured as the ratio of non-interest income to total assets, is also controlled. Furthermore, deposits (fraction of customer deposits to assets) are also controlled to capture how variation in funding models impact profitability (King et. al. 2016). According to Demirgüç-Kunt et al. (2013), banks which fund operations with a larger fraction of deposits are less likely to face funding fragility. Evidence shows that banks that follow riskier policies and retain larger amounts of earnings are more likely to perform better (Adams et al., 2012). In accordance with King et al. (2016), volatility and retained earnings (fraction of retained earnings to assets) are controlled. Whereas in the study of King et al. (2016), volatility is taken as the standard deviation of daily stock returns, in this study volatility is computed as the standard deviation of monthly stock returns. And also, to comply with the literature, macro-economic conditions which are measured at the Federal Reserve Bank of Philadelphia's state-coincident index are also controlled.

Table 2 shows descriptive statistics for the selected variables of the model. In this study, the mean result for profitability, measured as ROA, is 0.27 An average bank in the sample holds 9.5% equity capital and has high charter value. The findings in this study with respect to equity capital, charter value, non-interest income, deposits, retained earnings are consistent with the current literature findings. Bank size and volatility change from sample to sample so the results are consistent with some other studies in the literature.

Table 2: Descriptive Statistics for Full Sample

	Mean	Sd	p50	p25	p75	Min	Max
Profitability	0.027	0.016	0.027	0.015	0.039	-0.018	0.065
Bank size	9.569	1.425	9.258	8.545	10.342	7.329	14.085
Equity capital	0.095	0.029	0.091	0.076	0.108	0.036	0.214
Charter value	0.685	0.394	0.592	0.427	0.828	0.076	2.543
Non-interest income	0.017	0.015	0.013	0.008	0.021	-0.000	0.107
Deposits	0.698	0.105	0.706	0.631	0.780	0.341	0.886
Volatility	0.086	0.052	0.073	0.051	0.105	0.026	0.333
Retained earnings	0.047	0.035	0.049	0.028	0.069	-0.081	0.131
Macroeconomic conditions	94.240	8.902	95.220	88.120	100.160	63.270	119.780
Observations	1,575						

Note: Table 2 presents descriptive statistics of variables. This table shows summary statistics for 1,575 bank year observations. P25, P50(median), p75 represents quartile values for the variables. Profitability is the industry-adjusted measure of bank profitability, defined as bank ROA minus the mean ROA of all other banks per annum. Bank Size is calculated as the natural log of total assets. Equity Capital represents the ratio of total equity to assets. Charter Value is the log of the market-to-book value of equity. Non-interest Income is calculated as the fraction of non-interest income to total assets. Deposits presents the ratio of customer deposits to assets. Volatility is the standard deviation of daily stock returns. Retained Earnings is the fraction of retained earnings to assets. Macroeconomic Conditions represents Coincident Index for each state where a bank is headquartered as provided by Federal Reserve Bank of Philadelphia.

The mean difference results are presented in Table 3 below. The table represents the differences between the banks that hire a CRO or not. In terms of profitability, bank size, charter value, non-interest income, deposits, volatility, and retained earnings; the differences are statistically significant at %1. The banks which are larger in size hire CRO more than the banks which are smaller in size. The banks whose volatility level is high, hire CRO in their management team. So, it can be inferred from the results that more risky banks tend to hire more CROs in comparison to the banks that are less risky. This result is consisted with the findings of Pagach and Warr (2011) suggesting that larger firms and those with greater exposure to risk are more likely to recognize the potential benefits of ERM and are more likely to invest in a CRO to oversee the implementation of ERM strategies. This indicates that firms recognize the importance of managing risk in order to maximize returns and minimize losses, and are willing to invest in the necessary personnel to ensure proper risk management.

Table 3: Mean Differences Table

	Without CRO Mean N=1169	With CRO Mean N=406	Diff.	t-statistics
Profitability	0.029	0.022	0.007	7.501***
Bank size	9.425	9.985	-0.560	-6.925***
Equity capital	0.095	0.094	0.001	0.579
Charter value	0.650	0.785	-0.135	-6.010***
Non-interest income	0.016	0.020	-0.004	-4.885***
Deposits	0.693	0.710	-0.017	-2.818***
Volatility	0.083	0.095	-0.012	-4.047***
Retained earnings	0.049	0.042	0.007	3.356***
Macroeconomic conditions	93.294	96.962	-3.668	-7.270***

Note: Table 3 represents mean differences of the variables used in the paper. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

b. Results of the Empirical Model

This study investigates the impact of the existence of CRO on performance for a sample of banks that is described in detail above. The primary variable is the existence of CRO, control variables are mentioned in Section 3 above, year effects are controlled by including year fixed effects into the model. Because the presence of a CRO is relatively constant over time we do not include bank level fixed effects since it is problematic due to multicollinearity problem

Panel data analysis is employed in this study since this methodology combines time series and cross-sectional observations; thus, enabling data variability, enhanced informativeness, and higher degrees of freedom. Therefore, the applied model is considered to be superior to the models that only utilize one of those dimensions. Additionally, this methodology controls for heterogeneity, whereas time-series and cross-sectional analysis can come up with biased results in the case of heterogeneity (Baltagi, 2001). Additionally, problem of multi-collinearity is also reduced (Wooldridge, 2002).

In order to determine the estimator to be applied for model, numerous tests are run. Firstly, the existence of multicollinearity is checked and, no problem is detected among the selected variables. Secondly, to determine whether there is any unit effect or not; Likelihood-Ratio and F tests are run. According to the results, the model is found to have unit effects. Thirdly, to examine whether there is any time effect or not; F and LM tests are run and the model is found to have time effects. Accordingly, these results show that the model is not classical. To understand whether the model has fixed effect or random effects; Hausman test is run, the results of which can be found in Appendix 2. As the value of prob >chi2 is 0.000, H_0 stating that the difference between parameters is not systematic is rejected and the model is determined to be a two ways fixed effect model. After that heteroskedasticity test is conducted and the results are found to demonstrate the presence of heteroskedasticity. Then, in order to test for autocorrelation; Modified Bhargava et al. Durbin-Watson and Baltagi-Wu LBI Tests are run, and the model is found to be free from autocorrelation (Tatoglu, 2021).

Table 4 represents the regression results. According to the regression results, no significant relationship is detected between hired CRO in the bank and bank profitability. Though the coefficient is found to be positive, it is not significant. The findings of this study are consistent with the results of Quon et al. (2012). According to this study, the assessed levels of economic or market risk exposure or consequences are not found to be related with firm performance. Another study, which finds an insignificant relationship, is that of Smithson and Simkins (2005) and their findings show that the evidence that risk management increases firm value is fairly limited.

According to the panel data analysis results, equity capital, charter value, non-interest income, deposits are found to have significant relationships with profitability with all demonstrating 1% level of significance. In this study, charter value is calculated as book to market value of equity so, as consistent with the formula, the sign is negative in line with the expectations and the result is consistent with findings of King et al. (2016). Volatility and retained earnings have significant relationships with profitability but the level of significance is 10% which is lower than the level of other significant variables. Considering R-squared result, the explanatory power of the model is 65%.

Table 4: The impact of CROs and Firm Profitability and Stock Return Volatility

Variables	Profitability	Volatility
CRO	0.032	0.002
	(0.76)	(1.02)
Bank size	-0.001	-0.005***
	(-0.07)	(-7.57)
Equity capital	9.504***	-0.417***
	(13.63)	(-12.69)
Charter value	-1.108***	0.062***
	(-16.64)	(21.58)
Non-interest income	32.615***	0.574***
	(24.03)	(9.20)
Deposits	0.553***	0.001
	(2.86)	(0.13)
Volatility	0.963*	
	(1.76)	
Retained earnings	1.092*	-0.135***
	(1.87)	(-4.96)
Macroeconomic conditions	-0.004	-0.001**
	(-0.90)	(-2.41)
Constant	1.953***	0.160***
	(3.85)	(6.99)
Observations	1,575	1,577
R-squared	0.646	0.628
Year FE	Yes	Yes

Note: The column 1 of the table 4 represents regression results of the model 1, examining existence of CRO impact on

bank profitability. The column 2 presents the results of panel data regressions where dependent variable is volatility. In both regressions, the main independent variable of interest is CRO Dummy that equals 1 for firms that announced CRO appointments, 0 for firms in the control sample. The control variables are described in Appendix 1. The model includes year fixed effects. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

After investigating the relationship between the presence of CRO and profitability, another panel data analysis is conducted to examine the relationship between CRO and another variable; namely, stock return volatility. As it is shown in the second column of Table 4, no significant relationship is detected between presence of CRO and volatility, though the sign of the coefficient is positive.

Also, the relationship between CRO and Bank size is investigated to observe whether CROs have any influence on bank size. Therefore, another regression is conducted and, the results are provided in Table 5 below. According to regression results, the existence of CRO has a positive relationship with Bank size at 1% level of significance. However, it is also important to note that this significant positive relation between the existence of CRO and bank size might be due to endogeneity.

Table 5: The Relationship between CRO and Bank Size

Variables	Bank Size
CRO	0.423***
	(5.96)
Equity capital	-10.378***
	(-8.98)
Charter value	0.654***
	(5.85)
Non-interest income	28.122***
	(12.80)
Deposits	-4.940***
	(-16.21)
Volatility	-6.594***
	(-7.20)
Retained earnings	2.836***
	(2.86)
Macroeconomic conditions	0.005
	(0.68)
Constant	11.704***
	(14.40)
Observations	1,575
R-squared	0.326
Year FE	Yes

Note: This table represents regression results of the model, examining the relationship between existence of CROs and banks' size. The main independent variable of interest is CRO Dummy that equals 1 for firms that announced CRO appointments, 0 for firms in the control sample. The control variables are described in Appendix 1. The model includes year fixed effects. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels.

5. Conclusion and Discussion

This study is conducted by utilizing the Compustat database, specifically focusing on North American banks. The paper examines whether the existence of CRO affects bank's profitability or not. According to regression results, no significant relationship is detected between CRO and profitability. Although the relationship is positive as expected, it is not significant. As additional analyses, the relationship between existence of CRO and the banks' volatility is also checked. While initial univariate analysis in Table 3 provides some evidence of difference in terms of stock return volatility there is also no significant relationship between two variables in our panel data analysis. The relationship between existence of CRO and bank size is also checked. According to regression results, existence of CRO is found to be positively and significantly related with bank size at 1% level of significance.

Our study's findings align closely with those of Lundqvist S. and Vilhelmsson A. from their 2018 investigation into the relationship between Enterprise Risk Management (ERM) implementation and default risk in a dataset of 78 major global banks. They concluded that ERM implementation does not significantly influence credit ratings, which are indicative of default risk and financial ratios. Similarly, our results resonate with those of Pagach D. and Warr R.'s 2010 study on 106 U.S. firms, predominantly financial, that announce hiring a CRO. According to their findings, while they observed a decrease in earnings volatility in some firms with a CRO, their overall findings showed minimal impact of a CRO's presence on a broad range of firm variables. These results are similar to ours and underscore the consistency and relevance of our study's outcomes in the context of existing research.

It is possible that the observed significant and positive correlation between the presence of a Chief Risk Officer (CRO) and the size of a bank could stem from endogeneity. In other words, it might be that larger banks tend to appoint more CROs due to their size, rather than the presence of a CRO directly contributing to the bank's larger size. Distinguishing between these two scenarios necessitates further robustness tests, which are beyond the scope of this study and are suggested as a direction for future research.

References

Adams, R. B. and Mehran, H. (2012). Bank board structure and performance: evidence for large bank holding companies. *Journal of Financial Intermediation,* 21 (2): 243–267.

Banham, R. (2005). Enterprising Views of Risk Management. *Articles of Merit Award Program for Distinguished Contribution to Management Accounting,* August: 14–21.

Bailey, C. (2019). The Relationship Between Chief Risk Officer Expertise, ERM Quality, and Firm Performance. *Journal of Accounting, Auditing & Finance* , 37(1): 1-25.

Baltagi, B. H. (2001). *Econometric analysis of panel data*. (2nd ed.). United Kingdom.

Colquitt, L. L., Hoyt, R. E. and Lee, R. B. (1999). Integrated Risk Management and The Role of Risk Manager. *Risk Management and Insurance Review,* 2(3): 43-61.

Cumming, C. M. and Hirtle, B. J. (2001). The Challenges of Risk Management in Diversified Financial Companies. *Economic Policy Review,* 7(1): 1-17.

Deloitte, (2008). *Perspectives on ERM and the Risk Intelligent Enterprise.* (http://www.ipai.pt/fotos/gca/surveyerm_pt_1_123.333.8524.pdf).

Demirgüç-Kunt, A., Detragiache, E. and Merrouche, O. (2013). Bank capital: lessons from the financial crisis. *Journal of Money Credit and Banking,* 45 (6): 1147–1164.

Demirgüç-Kunt, A. and Huizinga, H. (2010). Bank activity and funding strategies: the impact on risk and returns. *Journal of Financial and Economics,* 98 (3): 626–650.

Pagach, D. and Warr, R. (2010). The Effects of Enterprise Risk Management on Firm Performance, *Social Sciences Research Network.* Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1155218.

Pagach, D. and Warr, R. (2011). The Characteristics of Firms That Hire Chief Risk Officers. *The Journal of Risk and Insurance,* 78(1): 185-211.

Fahlenbrach, R. and Stulz, R. M. (2011). Bank CEO incentives and the credit crisis. *Journal of Financial Economics,* 99(1): 11-26.

Hambrick, D. C. and Mason, P. A. (1984). Upper Echelons: The Organization as a Reflection of Its Top Managers. *The Academy of Management Review,* 9(2):193-206.

Mehran, H. (1995). Executive compensation structure, ownership, and firm performance. *Journal of Financial Economics*, 38(2):163-184.

Liebenberg, A. P. and Hoyt, R. E. (2003). The Determinants of Enterprise Risk Management: Evidence From the Appointment of Chief Risk Officers. *Risk Management and Insurance Review,* 6(1): 37-52.

King, T., Srivastav, A. and Williams, J. (2016). What's in an education? Implications of CEO education for bank performance. *Journal of Corporate Finance*, 37(1): 287-308.

Lam, J. (2001). The CRO Is Here to Stay. *Risk Management,* 48(4): 16-22.

Beasley, M., Pagach, D. and Warr, R. (2008). Information Conveyed in Hiring Announcements of Senior Executives Overseeing Enterprise-Wide Risk Management Processes. *Journal of Accounting, Auditing and Finance,* 23(3): 311-332.

Grace, M. F., Leverty, J. T., Phillips, R. D. and Shimpi, P. (2015). The Value of Investing in Enterprise Risk Management. *Journal of Risk and Insurance,* 82(2): 289-316.

Meulbroek, L. K. (2002). Integrated Risk Management for the Firm: A Senior Manager's Guide. *Journal of Applied Corporate Finance*, 14(4): 56-70.

Nocco, B.W. and Stulz, M. (2006). Enterprise risk management: theory and practice. *Journal of Applied Corporate Finance,*18(4): 8-20.

Pernell, K., Jung, J. and Dobbin, F. (2017). The Hazards of Expert Control: Chief Risk Officers and Risky Derivatives. *American Social Review,* 82(3): 511–541.

Quon, T. K., Zegnal, D. and Maingot, M. (2012). Enterprise risk management and firm performance. *Procedia-Social and Behavioral Sciences*, 62: 263-267.

Baxter, R., Bedard, J. C., Hoitash, R. and Yezegel, A. (2013). Enterprise Risk Management Program Quality: Determinants, Value Relevance, and the Financial Crisis. *Contemporary Accounting Research,* 30(4): 1264-1295.

Smithson, C. and Simkins, B. J. (2005). Does risk management add value? A survey of the evidence. *Journal of Applied Corporate Finance,* 17(3): 8-17.

Sterngold, J. (2014). After Crisis, Risk Officers Gain More Clout at Banks, *Wall Street Journal,* June.

Lundqvist, S., A. and Vilhelmsson, A. (2018). Enterprise Risk Management and Default Risk: Evidence from the Banking Industry. *Journal of Risk and Insurance,* 85(1): 127-157.

Tatoglu, F. (2021). *Panel Veri Ekonometrisi-Stata Uygulamali,* Istanbul: Beta Press.

Westman, H. (2011). The impact of management and board ownership on profitability in banks with different strategy. *Journal of Banking and Finance*, 35(12): 3300-3318.

Williamson, O. (1967). Hierarchical control and optimum firm size. *Journal of Political Economy,* 75(2): 123-138.

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. London: The MIT Press.

https://www.philadelphiafed.org/surveys-and-data/regional-economic-analysis/state-coincident-indexes

Appendix 1

Definition of Variables;

CRO (Chief Risk Officer): Dummy that equals one for firms that announced CRO appointments, 0 for firms in the control sample (Execucomp database).

Bank Size: The natural log of total assets (Compustat North America database).

Equity Capital: A ratio of total equity-to-assets (Compustat North America database).

Charter Value: Book-to-market value of equity (Compustat North America database).

Deposits: A ratio of customer deposits-to-assets (Compustat-Bank database).

Volatility: The standard deviation of monthly stock returns (CRSP database).

Non-interest Income: The ratio of non-interest income-to-total assets (Compustat-Bank database).

Retained Earnings: The ratio of retained earnings to assets (Compustat North America database).

Macroeconomic Conditions: Coincident Index for each state where a bank is headquartered as provided by Federal Reserve Bank of Philadelphia (Federal Reserve of Philadelphia website).

Appendix 2

	fe	re	Difference	S.E.
CRO	-0.063	0.001	-0.065	0.043
Bank size	-0.180	0.029	-0.209	0.060
Equity capital	14.575	10.991	3.584	0.837
Charter value	-1.059	-1.131	0.071	0.031
Non-interest income	33.969	36.228	-2.259	2.518
Deposits	1.017	1.073	-0.055	0.262
Volatility	-1.828	-0.902	-0.926	0.167
Retained earnings	-10.092	-2.230	-7.862	0.796
Coincident index	-0.021	-0.027	0.005	0.002

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$chi2(9) = (b-B)'[(V\_b-V\_B)^{(-1)}](b-B)$

= 154.04

Prob>chi2 = 0.0000