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Shahbaz, Muhammad and Bhattacharya, Mita and Mahalik,  
Mantu Kumar

Energy and Sustainable Development, Montpellier Business School  
Montpellier, France., Monash University, Australia, National  
Institute of Technology (NIT), Rourkela-769008, Odisha, India

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Finance and Income Inequality in Kazakhstan: Evidence since Transition with Policy  
Suggestions

**Muhammad Shahbaz**

Energy and Sustainable Development, Montpellier Business School  
Montpellier, France. Email: [shahbazmohd@live.com](mailto:shahbazmohd@live.com)

**Mita Bhattacharya**

Department of Economics, Monash University,  
Caulfield, Victoria 3145, Australia.  
Email: [Mita.Bhattacharya@monash.edu](mailto:Mita.Bhattacharya@monash.edu)

**Mantu Kumar Mahalik**

Department of Humanities and Social Sciences  
National Institute of Technology (NIT), Rourkela-769008, Odisha, India,  
Email: [mahalikm@nitrrkl.ac.in](mailto:mahalikm@nitrrkl.ac.in)

**Abstract:** Kazakhstan gained independence in 1990 and has undergone significant changes in economic, social and trade conditions since then. We analyse the effects of financial development on income inequality in Kazakhstan, incorporating economic growth, foreign investment, education and the role of democracy as the drivers. We establish that income inequality in Kazakhstan is impaired by financial development. In summary, we send the three messages for policy purposes. First, strengthening financial sector is necessary to close the gap between 'haves and have-nots'. Second, attracting foreign direct investment beyond the hydrocarbon sector is necessary to alleviate inequality. Finally, adaptation of education system to the new social and economic environment would help in improving income distribution.

Keywords: Kazakhstan, Finance, Inequality, Central Asia

For one very rich man, there must be at least five hundred poor, and the affluence of the few supposes the indigence of the many. (Adam Smith, 1776: 232)

## 1. Introduction

Since the country gained independence in 1990, income inequality has been a major concern for Kazakhstan. Mikhalev (2003) provides an excellent survey in portraying the transition of Kazakhstan from Soviet-style economic egalitarianism to a society with conspicuous inequality led by 'resource nationalism'. Decreasing output, increasing income inequality, hyperinflation and the breakdown of social safety nets were endemic in the early 1990s. Against this backdrop, a sharp rise in income inequality during the transition to independence has created wide-ranging policy challenges for the government in promoting inclusive growth in this newly transitioned country.

The development of major oil fields in Kazakhstan began in 1989, with oil itself being the major export product. The second half of 1990s reversed the earlier economic situation through oil exports, prudent macroeconomic policies by government, hard budget constraints on enterprises and the banking sector, the removal of trade distortions, and with liberalised pricing policies. Various economic reforms have resulted in unprecedented average growth rates of 6% per annum between 1996 and 2013 (International Monetary Fund, 2014). The population below the poverty line has declined significantly. However, high levels of income inequality remain visible in rural areas (Agarwal, 2007; CIA, 2010). Various policies such as cash transfer to migrants, tax on real estates, and price subsidies to the rural poor are being introduced to combat in reducing regional inequalities.

The financial sector remains weak, and one third of bank loans are non-performing assets (ADB, 2012). The National Bank of Kazakhstan (NBK) plays a major role in targeting inflation, and recently implementing various measures to deal with bad loans.

Kazakhstan is an interesting case study in many respects. The economy has progressed significantly since 1990 through economic development, shifts in market system and industrialisation, and a boom in oil exports. High priorities under the Kazakhstan 2050 Vision and its ambitious sub-program, the Millennium Development Goals program, include reducing the proportion of people in rural areas who rely on subsistence income, providing universal secondary education, and increasing the representation of women in national planning and budgeting.

Economic growth has not been inclusive as new jobs are limited almost exclusively to the oil sector. There is therefore a significant need to develop the labour market through private sector investment outside the oil sector. The role of financial sector is also important in influencing economic growth and income inequality. Financial development includes policies, factors and institutions leading to efficient intermediation and an effective financial market within a country in implementing monetary and fiscal policies, economic growth and transfers of tax and expenditure have previously been significant in maintaining fiscal position.

Within the existing literature, a few studies relate household survey data for Kazakhstan to relate income inequality with microeconomic factors. Pomfret (2006) analyses the consumption distribution in Kazakhstan during the 1990s and reports constancy of the Gini-coefficients for household consumption. Hare and Naumov (2008) using household-level data to establish that oil shock did not have a significant effect on income inequality from 2001 to 2005. In contrary, a study by Howie and Atakhanova (2014) indicates that the resource boom in Kazakhstan actually has reduced income inequality. The role of institution and education are identified as key factors in reducing income inequality in urban areas. Studies in existing literature are based on cross section and longitudinal series with conflicting empirical findings. We fill the gap in literature considering both economic and

non-economic factors within the economy in explaining inequality. The role of financial development has been combined with these factors. In this respect, we state our contribution here. First, we employ augmented income inequality function by incorporating financial development and economic growth along with the role of foreign direct investment, education and democracy in explaining income distribution of the economy for the period of 1990-2014. Second, we employ plausible econometric techniques in establishing short and long-run dynamics across variables. The Zivot-Andrews (1992) and bounds testing approach developed by Pesaran et al. (2001) are employed in the presence of structural breaks in the series. The significance of structural breaks are noticeable particularly after the reform period. Cause and effect between income inequality and various determinants is examined by applying innovative accounting (IAA). The IAA forecasts the effects of exogenous innovation (shock) beyond the sample period. Third, our findings reveal that economic growth improves income distribution by lowering income inequality. Financial development increases income inequality. Foreign investment and education have negative effect on income inequality but democracy worsens income distribution. The association between financial development and income inequality is U-shaped. In policy context, the government needs to balance the development of financial sector, foreign investment and education sector in achieving growth and equity in future.

The remainder of this paper is set as follows. Section 2 briefly reviews the empirical literature. Section 3 describes empirical model, variables with measures with some descriptive statistics. Section 4 discusses the empirical findings. The final section presents the core findings and indicates some policy suggestions.

## 2. A Brief Review of Literature

In the following sub-sections, we briefly review the literature relating key variables of our model on economic and non-economic factors with income inequality. We discuss the major

findings and explain their relevance in the context of Kazakhstan. This sub-section of the review relates directly to the proposed unified empirical model in Section 3.

### *2.1. Finance-growth-income inequality*

There is a large body of literature related to the general idea that financial development accelerates economic growth (Levine, 1997, 2005; Beck *et al.* 2007 and Hermes & Lensink 2013). The Kuznets hypothesis (1955) spawned a vast body of theoretical and empirical literature on the link between economic growth and income inequality.<sup>1</sup> De Dominicis *et al.* (2008) perform a meta-analysis of more than 400 estimates on economic growth-income inequality nexus and establish that the estimation method, data quality and sample size affect the relationship between both variables. The literature concludes that the relationship between income inequality and economic growth is complex, and no consensus has yet been reached.

The researchers are not in one mind whether financial development benefits the whole population equally, or whether it disproportionately benefits the rich or the poor, particularly for countries in transition. Three distinct hypotheses can be listed as the finance-income inequality widening hypothesis; the finance-income inequality narrowing hypothesis; and the finance-income inequality inverted U-shaped hypothesis. The first two hypotheses are derived from the conceptual frameworks of Banerjee and Newman (1993) and Galor and Zeira (1993), while the third hypothesis was proposed based on the theoretical foundation of Greenwood and Jovanovich (1990).

The finance-income inequality widening hypothesis claims that financial development may be of benefit only to wealthy individuals when the institutional quality is weak. This hypothesis further suggests that financial development benefits the rich due to

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<sup>1</sup> The well-known Kuznets (1955) hypothesis describes an inverted-U relationship between per-capita income and inequality. In the early phase of economic development, income inequality increases, then stabilises, and eventually declines after a threshold point of economic development.

their perceived credit-worthiness to the banks. The socially and economically backward poor individuals, on other hand, lack both the financial credibility and sufficient collateral to be seen as good investments. They may find it difficult to access the financial services within financial institutions. Therefore, the poor are equipped only with primary education, and join the unskilled labour market at lower wages. Combining these factors, we conclude that financial development increases income inequality and a positive association between financial development and income inequality is expected.

The finance-inequality narrowing hypothesis assumes that the poor have access to credit from the financial institutions due to the new widespread financial development. The poor, who can now access better education, implement innovative ideas, and develop managerial skills due to their improved financial situations, will benefit from better employment opportunities. This will eventually lead to an increase in their labour productivity. Financial development may thus improve the income distribution of the countries in transition (Jalilian and Kirkpatrick, 2002).

In the third hypothesis, developed by Greenwood and Jovanovich (hereafter GJ, 1990), only the rich can afford to access and benefit from the developed financial markets during the early stages of economic development, which intensifies income inequality. At higher levels of economic development, financial development progressively benefits a larger section of the population.

Studies by Galor and Zeira (1993), and Banerjee and Newman (1993) suggest that the presence of a strong credit market improves income distribution. Their findings indicate that the initial income gap between the rich and the poor will not be meaningfully reduced without sound financial markets. Similarly, Canavire-Bacarreza and Rioja (2009) states that “given their lack of collateral and scant credit histories, the poor entrepreneurs may

be the most affected by financial market imperfections, such as information asymmetries, moral hazard problems, contract enforcement costs, and higher transactions costs”.

There are other channels through which financial development may increase income inequality. For example, Dollar and Kraay (2002), Behrman *et al.* (2003) and Beck *et al.* (2004) argue that in the early stages of financial development, the poor segments of the population may find it difficult to access credit from the financial institutions due to lack of financial literacy. Perotti (1996), Claessens (2006) and Claessens and Perotti (2007) and others have also shown that the formal financial sector do not provide loans to the poor due to their low education level. In such circumstances, poor individuals are unable to leave the cycle of income inequality, and eventually income inequality intensifies.

In contrast, Bourguignon and Verdier (2000) argue that the perceived benefit to the poor is not due to the financial development of a country but to the reliance of the poor on informal credit assessment networks. This implies that the poor are still denied access to bank credit due to credit constraints. Therefore, in such circumstances, financial development would only benefit the rich class of the population on account of their credit-worthiness, therefore increasing income inequality.

Similarly, Honohan (2004), Beck *et al.* (2004), and Stijn and Perotti (2007) established that financial development and income inequality have feedback effect i.e. bidirectional causality. In a cross-country study of 49 developed and developing countries, Beck *et al.* (2007) find that financial development disproportionately increases the income of the poor and reduces income inequality. Tan and Law (2012) suggest that financial deepening significantly reduces income inequality, providing support to the inequality-narrowing hypothesis. Their findings indicate that the response of income inequality is sensitive to various aspects of financial deepening. Demirgüç-Kunt and Levine (2008) conclude that “While the empirical literature suggests that financial development reduces the persistence of



relative incomes across generation, there are many questions and gaps that should be addressed by future research.”

In summary, these empirical studies indicate that the financial development-income inequality nexus depends on the stage of development, control variables used and econometric techniques applied. Therefore, we have chosen the newly transitioned country of Kazakhstan, in which the financial sector plays a significant role in analysing income inequality and economic growth during the period of transition.

## *2.2. Foreign direct investment (FDI)- income inequality*

Foreign direct investment brings increased knowledge and technology improvement and can be major source of economic growth, particularly for developing countries. Existing literature is divided on the effects of FDI on income inequality, which may vary significantly across geographic regions (Tsai 1995), with differences in capital inflows increasing skilled labour demand, stages of development, work force and overall infrastructure (Feenstra and Hanson 1997; Lipsey and Sjöholm 2001). For example, the multinational investors may induce a reduction in the labour wage by putting pressure on the labour union of the country. This will affect the lower and middle classes in particular. The workers may lose some bargaining power as multinationals may threaten to withdraw their investment (Salvatore, 1998). The capital-intensive nature of multinationals also creates an artificial dual economic structure comprising a small advanced sector and a large backward sector within the economy (Nafziger, 1997; Robbins, 1996 and Tsai, 1995). Access to capital and technology from FDI may improve corporate governance and management practices. This may increase the productivity of the skilled labour sector, thereby promoting economic growth and increasing income inequality (Markusen and Venables, 1999).

In contrast, FDI reduces income inequality as the multinationals utilise the abundant low-income unskilled labour of the host countries (Deardorff and Stern, 1994). Mah (2002) reports, for instance, a deteriorating effect of FDI inflows on the Gini-coefficients, which were used as a proxy for measuring income inequality in a case study on Korea. This finding is supported by Zhang and Zhang (2003) for China, where foreign trade and FDI has reportedly increased regional inequality. Studies by Lindert and Williamson (2001) and Milanovic (2002) do not establish any significant relationship between FDI and income inequality. Choi (2006) reports an increase in income inequality with increasing FDI intensity using different proxies. Herzer *et al.* (2014) establish a positive relationship between FDI and income inequality for Latin American countries. The increasing effect of FDI on income inequality represents a policy dilemma for these countries who wish to welcome foreign investment while simultaneously reducing income inequality and poverty. Figini (2011) reports the presence of a nonlinear effect in developing countries only not for developed countries. The effect of foreign investment on income inequality depends on stages of development. Since gaining independence, significant foreign investment has taken place in Kazakhstan, particularly in the mineral and oil sectors, through management contracts, joint ventures and sales. Therefore testing the effect of foreign investment on income inequality will shed some light on future economic development in Kazakhstan.

### *2.3. Education- income inequality*

The vast quantity of literature on the influence of education on income inequality may be divided into two broad categories. The composition effect describes the way in which unequal education distribution leads to higher income inequality, while the compression effect increases the average education level resulting in a positive effect on income distribution, as suggested by Knight and Sabot (1983). Long term investment in technology

and higher education will have higher compression effect than composition effect, leading to a more equal distribution of income. This has been emphasised by Acemoglu *et al.* (2013) and Kawachi and Subramanian (2014). Juhn *et al.* (1993) establishing an increase in wage inequality is primarily attributable to an increase in education, along with other factors. We find that existing studies in literature provide conflicting empirical findings on education-inequality nexus. This discrepancy is due to random sampling errors, mis-specification biases and the possibility of selectivity in the reporting of results for various countries as suggested in Yang and Qiu (2016)<sup>2</sup>.

#### *2.4. Democracy- income inequality*

Democracy, by definition, includes broad political representation and a national political regime based on free elections (e.g., Diamond, 1999). The effect of any political system on a country's income distribution depends on its laws, institutions and policies and its success in mobilising aggregate preferences. Democracy is based on the principles of “one person, one vote” and of a representative government and is often associated with income redistribution policies (e.g., welfare spending, progressive taxation, price subsidies). According to earlier literature by Lenski (1966), democracy redistributes political power in favour of the majority and has a reducing effect on inequality.

Democracy promotes an egalitarian distribution of income, while allowing the poor to demand more equitable income redistribution (e.g., Boix, 1998; Chan, 1997). The literature regarding the effect of democracy on income distribution, however, is far from a consensus. Muller (1988), Moon (1991), and Rodrik (1998) report that democracy reduces income inequality. However, Deininger and Squire (1998) and Power and Gasiorowski (1997) establish that the effect of democracy on income inequality is statistically insignificant. Chan

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<sup>2</sup> Educational focus from 1990 onwards has fostered a ‘de-Sovietised-re-Kazakhified’ national identity within the education system. This will have a significant effect on development, income inequality and the overall social welfare of Kazak citizens.

(1997) reports mixed findings, and Simpson (1990) argues that income inequality rises with democracy up to some level of democracy and then declines.

In a recent survey, Acemoglu *et al.* (2013) suggest that there is a need for systematic investigation of the conditions under which democracy reduces income inequality and increase redistribution. In conclusion they state that “ It may also be that because different researchers have looked at different sets of countries in different periods, the differing results are to some extent picking up situations where one or other of the mechanisms we have identified are more dominant.”

Combining the four aspects of literature, this research highlights an alternative policy approach to the analysis of income inequality. We propose that financial development will reduce market friction and boost economic growth without the potential incentive problems associated with redistributive policies. In this dynamic process, foreign investment, education and democracy will play a significant role during the transition process in Kazakhstan.

### 3. Inequality in Kazakhstan: An Empirical Model

In this section, first we propose an empirical model following the above discussion. Second, we analyse the preliminary trends for the major series and the descriptive statistics of the variables.

#### *3.1. Empirical model, variables and measures*

We examine the link between financial development and income inequality including economic growth, foreign direct investment, education and democracy as control variables for the case of Kazakhstan. The general functional form of our model is:

$$IE_t = f(Y_t, F_t, FI_t, E_t, D_t) \quad (1)$$

where  $IE_t$  is income inequality,  $Y_t$  represents economic growth,  $F_t$  is a measure of financial development,  $FI_t$  represents foreign direct investment,  $E_t$  is education index and  $D_t$  is democracy index. All series are converted to natural logarithms to reduce the sharpness in the time series data (Shahbaz, 2010) resulting in consistent and reliable estimates. For empirical purposes, we therefore consider the following version of the model:

$$\ln IE_t = \theta_1 + \theta_2 \ln Y_t + \theta_3 \ln F_t + \theta_4 \ln FI_t + \theta_5 \ln E_t + \theta_6 \ln D_t + \varepsilon_i \quad (2)$$

The variables in Equation 2 are thus simply the natural logarithms of the variables defined for Equation 1, with the exception of  $IE_t$  and  $F_t$ , for which the Gini-coefficient and domestic credit to the private sector are used as proxies, respectively. Remaining variable definitions are as follows: Foreign direct investment includes net inflows of FDI as a percentage of GDP; the education index is represented by a composite index of primary and secondary enrolments; and democracy is measured by political freedoms and civil liberties.  $\varepsilon$  is the residual term and consists of a normal distribution with finite variance and zero mean. The advantage of this measure of relative to alternative measures  $F_t$  is that it captures the amount of credit channelled from savers to the private sector while excluding credits given to the public sector and credits issued by the central and development banks. Credit to the private sector is regarded as a comprehensive measure of financial development in the literature (Beck *et al.* 2007, Polat *et al.* 2015).

The study employs annual time series data from 1990 to 2014. The GDP, domestic credit to private sector per capita<sup>3</sup>, Gini-coefficient, foreign direct investment and, primary, secondary and tertiary enrolments data have been sourced from the World Development Indicators (CD-ROM, 2015) series, published by the World Bank. All variables are measured in real terms. Democracy is measured by a summation of political freedoms and civil liberties scores.<sup>4</sup>

With the exception of income inequality, all other variables used in the study are measured per capita in order to avoid multicollinearity problems. To check the validity of the GJ hypothesis, we add a square term for financial development in the final version of the model:

$$\ln IE_t = \theta_{11} + \theta_{22} \ln Y_t + \theta_{33} \ln F_t + \theta_{44} \ln F_t^2 + \theta_{55} \ln FI_t + \theta_{66} \ln E_t + \theta_{77} \ln D_t + \varepsilon_t \quad (3)$$

Equation 3 represents a reduction in inequality if  $\theta_{33} < 0$  and  $\theta_{44} = 0$ . The income inequality increases if  $\theta_{33} = 0$  and  $\theta_{44} > 0$ , and the GJ hypothesis is confirmed if  $\theta_{33} > 0$  and  $\theta_{44} < 0$ . A U-shaped relationship between financial development and income inequality is accepted if  $\theta_{33} < 0$  and  $\theta_{44} > 0$ .

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<sup>3</sup> We chose domestic credit to the private sector as our measure of financial development following Levine (2008). This measure is one of the most widely used in the existing economics literature as an indicator of financial development. Various researchers have also used other measures of financial development such as M2 as share of GDP, liquid liabilities as share of GDP (Masih et al. 2009, Liang and Jian-Zhou 2010, Gantman and Dabós 2012). These measures are unable to measure financial development. The reason is that M2 as share of GDP contains large portion of currency and reflects monetization (Jalil and Feridun 2011). Liquid liabilities indicate the volume or size of financial sector rather than financial development (Creane et al. 2007). Contrarily, domestic credit to the private sector refers to financial resources disburses to the private sector via loans, purchases of non-equity securities, trade credit and other accounts receivable that establish a claim for repayment (Boutabba 2014). It also shows the actual level of domestic savings disburses to investors for productive investment ventures, which reflects financial development (Martin et al. 2013).

<sup>4</sup>Countries are assigned scores from 1 to 7, where small values represent greater liberties. For further details, see <https://freedomhouse.org/report-types/freedom-world>.

### 3.2. Trends and descriptive statistics

Figure 1 depicts a fluctuating trend in income inequality in Kazakhstan. Initially, income inequality increased rapidly from 1991 to 1993 and more gradually from 1994 to 2001. Since 2002, income inequality has improved in comparison to the previous years. The trend in GDP per capita is fluctuating, albeit positive, as shown in Figure 2.

Figure 3 depicts the trend in domestic credit to private sector per capita which is used as proxy for measuring financial development. The trend increased from 1996 onwards, then remained relatively low and stable between 2000 and 2005. The observed increasing trend in the financial development indicator after 2005 is attributed to revenue from the oil sector, which has created the inflow of external funds.<sup>5</sup>

Figure 1: Income inequality in Kazakhstan

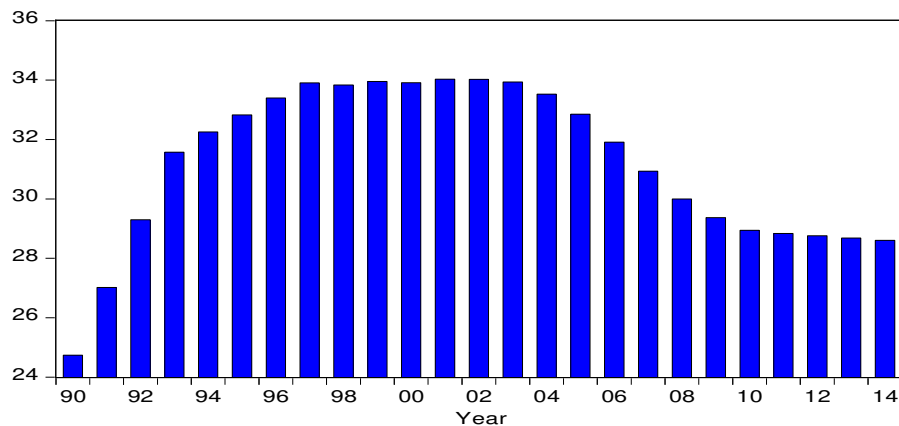


Figure 2: Real GDP per capita in Kazakhstan

<sup>5</sup> We present here the graphs for three key variables only to conserve the space.

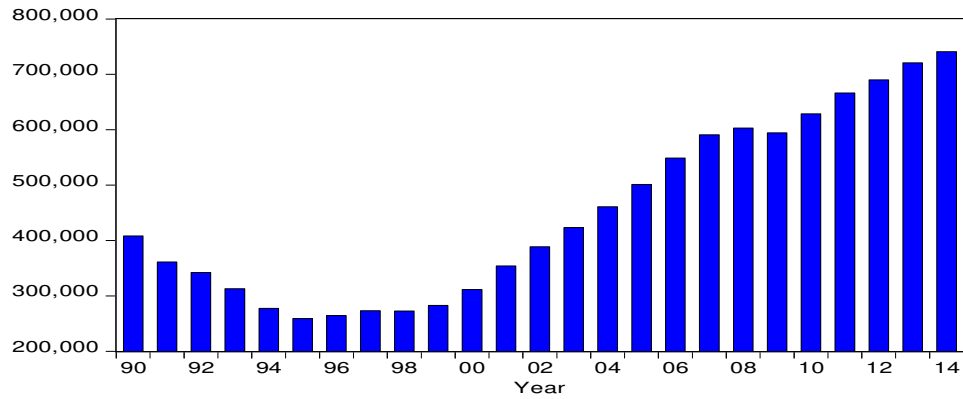
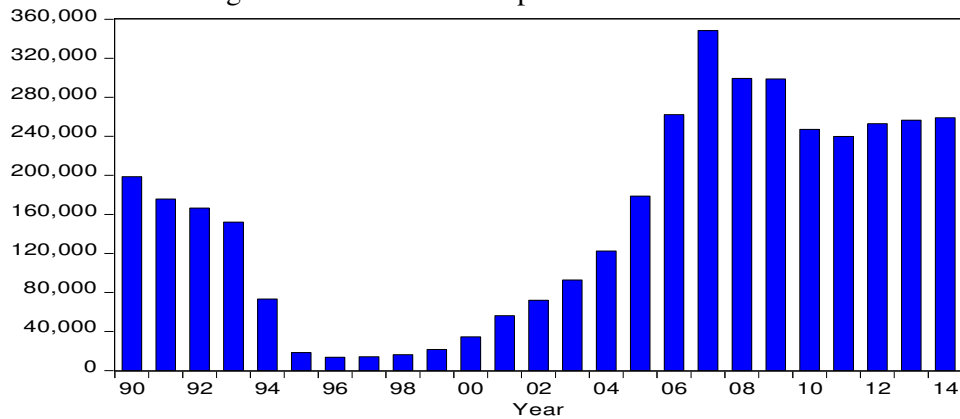


Figure 3: Financial development in Kazakhstan



The preliminary statistics, shown in Table 1, indicate that income inequality, economic growth, financial development, foreign direct investment, education and democracy have a normal distribution, as confirmed by Jarque-Bera test statistics. We note that financial development and foreign direct investment have high variation compared to democracy and income inequality. Economic growth is less volatile in comparison to financial development and foreign direct investment, however this is more volatile in comparison with democracy and income inequality.



Table 1: Descriptive Statistics

Variable	$\ln IE_t$	$\ln Y_t$	$\ln F_t$	$\ln FI_t$	$\ln E_t$	$\ln D_t$
Mean	3.4382	12.9569	11.5369	4.9695	4.4110	2.3619
Median	3.4629	12.9199	12.0225	5.1245	4.4677	2.3978
Maximum	3.5273	13.5155	12.7608	6.9782	4.6051	2.3978
Minimum	3.2084	12.4653	9.5129	1.8048	4.0945	2.1972
Std. Dev.	0.0873	0.36158	1.0950	1.5339	0.1525	0.0758
Jarque-Bera	2.5828	2.25221	3.2255	2.2490	2.6393	1.6184
Probability	0.2748	0.3242	0.1993	0.3248	0.2672	0.3840

Note: Ln: natural logarithm; IE: income inequality; Y: economic growth; F: financial development; FI: foreign direct investment; E: education; D: democracy.

#### 4. Discussion on long-run estimates

Our estimation strategy has three major steps. In the first step, we employ the Augmented Dickey-Fuller (ADF) by Dickey and Fuller (1979), Philips and Perron (PP, 1988), and Zivot-Andrews (ZA, 1992) tests to examine the stationarity properties of the variables. The first two unit root tests do not consider a structural break in the series. We implement two versions of the ZA test. The first version allows for a single break in the intercept of the trend variables, and the second version comprises a single break in each of the intercept and the slope of the trend function. The results of the ZA tests show that all variables are stationary at their first difference. Break periods span the time period from 1993 to 2005, each break period is significant as the economy traverses transition during this time, and the discovery of oilfields raised oil exports in 2006, which affected income inequality.<sup>6</sup>

In the second step of our estimation, we examine the long-run dynamics following the cointegration test. To avoid the small sample bias typical of traditional cointegration tests, we employ the autoregressive distributed lag (ARDL) bounds testing approach developed by Pesaran and Shin (1999). This test considers structural break. As discussed in the literature, the ARDL bounds test is flexible regarding the integrating order of the variables, whether variables are found to be stationary at I(1) or I(0) or I(1) / I(0).

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<sup>6</sup> The unit roots results are not reported to conserve the space.

A dynamic unrestricted error correction model (UECM) can be derived from the ARDL bounds testing through a simple linear transformation. The UECM integrates the short-run dynamics with the long-run equilibrium without losing any information. The findings reported in Table 2 imply that the computed F-statistics are greater than upper critical bound (UCB) at the 1%, 5% and 10% levels of significance respectively.<sup>7</sup> This implies the rejecting of the null hypothesis of no cointegration considering income inequality, economic growth, financial development and foreign direct investment as dependent variables. The hypothesis of no cointegration is accepted when education and democracy are used as dependent variables. This shows the presence of four cointegrating vectors implying that long-run dynamics exist among the most of the considered variables in our model.

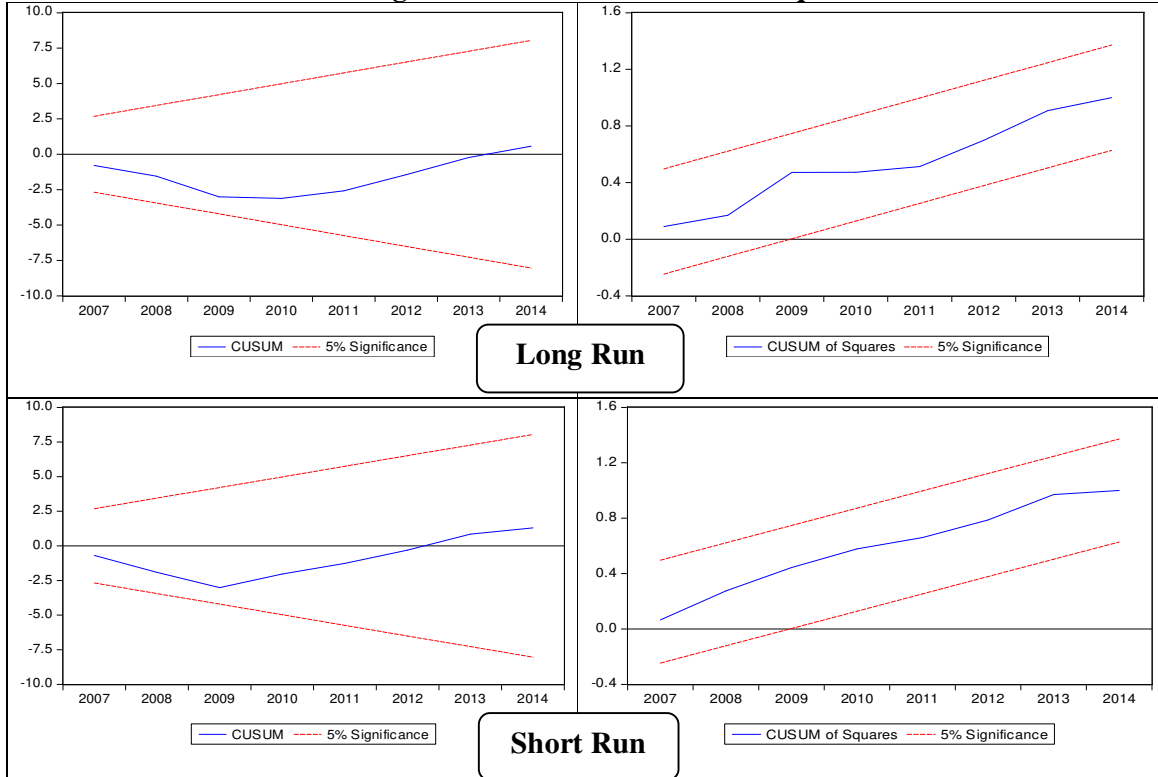
Table 2: Findings from the ARDL Bounds Test

Estimated Model	Optimal lags	Structural Break	F-statistics	$Adj - R^2$	D-W Test
$IE_t = f(Y_t, F_t, FI_t, E_t, D_t)$	1, 1, 1, 0, 1, 1	2006	8.789**	0.6678	1.5979
$Y_t = f(EI_t, F_t, FI_t, E_t, D_t)$	1, 1, 0, 0, 1, 1	1993	7.215***	0.8482	2.2841
$F_t = f(EI_t, Y_t, FI_t, E_t, D_t)$	1, 1, 0, 1, 1, 1	1994	9.941*	0.7593	2.4969
$FI_t = f(EI_t, Y_t, F_t, E_t, D_t)$	1, 1, 0, 1, 1, 0	1993	7.696***	0.8305	1.9175
$E_t = f(EI_t, Y_t, F_t, FI_t, D_t)$	1, 1, 0, 1, 0, 1	1995	1.473	0.6385	2.1441
$D_t = f(EI_t, Y_t, F_t, FI_t, E_t)$	1, 1, 1, 1, 1, 1	1994	3.069		
Critical values <sup>#</sup>	1 per cent level	5 per cent level	10 percent level		
Lower bounds	10.601	7.360	6.010		
Upper bounds	11.650	8.265	6.780		

Note: IE: income inequality; Y: economic growth; F: financial development; FI: foreign direct investment; E: education; D: democracy.\* and \*\*\* show the significance at 1% and 10% levels respectively. Critical bounds are generated by Narayan (2005). The lag lengths are determined using the Akaike Information Criterion (AIC).

<sup>7</sup> We use estimated values of the critical bounds from Narayan (2005). Further detail of the test is avoided here for the sake of conciseness.

**Figure-4: CUSUM and CUSUMsq**



In checking the parameter constancy, we employ the cumulative sum of recursive residuals (CUSUM) and the CUSUM square (CUSUMsq) tests proposed by Brown *et al.* (1975). The results of CUSUM and CUSUMsq are shown in Figure-4 (for long-run and short-run). We find that the graphs of both CUSUM and CUSUMsq remain between the critical bounds indicating the reliability of the ARDL estimates.

The presence of cointegration necessitates an investigation of the impact of financial development, economic growth, foreign direct investment, education and democracy on income inequality. The findings from the short-run and long-run estimates are reported in Table 3 and Table 4 respectively.

Economic growth is negatively linked with income inequality in the short-run. This result is not consistent with the theoretical argument of Kuznets (1955) and related studies. In the early stages of transition, oil sector investment has created a significant wage gap between urban and rural areas. Various fiscal measures and credit transfer policies have

been pro-active for this purpose. Fiscal sustainability and other complimentary strategies in non-oil sectors are essential to improving future income inequality in Kazakhstan. This has been emphasised by the International Monetary Fund (IMF, 2014).

In addition, the short-run estimate of financial development with income inequality indicates a positive association between finance and income inequality in Kazakhstan. This result agrees with the finance-income inequality widening hypothesis reported in Banerjee and Newman (1993), Dollar and Kraay (2002), Behrman *et al.* (2003), Beck *et al.* (2004). In the early stages of financial development, the poor segments of the population may find it difficult to access credit from the financial institutions due to their lack of collateral and financial illiteracy, which render them unworthy of credit as shown by Perotti (1996), Claessens (2006) and Claessens and Perotti (2007). Thus, better income distribution for the economy is becoming a more and more distant dream in the presence of greater financial development. Greater financial development is therefore expected to reduce income inequality in the transition through the provision of better education. In this sense, we recommend that the policymakers and governments of Kazakhstan design human capital (education) enhancing policies so that the lower sections of the people may benefit from the higher levels of education, thereby enabling them to increase their income level. Increasing their income level is projected to increase the credit worthiness of poor people and thereby allow them greater to access the financial services. The poor people with access to financial services will be able to further increase their investments in better education and for other purposes. The income level of the poor should also be increased as a consequence, and therefore income inequality should eventually be reduced.

Table 3 shows that education has a negative and significant effect on income inequality. In the short-run, this trend attributed to the fact that poor people with a better level of education may be able to get higher wages in the labour market, leading to more equal

income distribution over time. As a result, the income inequality between haves and have-nots is expected to be reduced in a transition economy such as Kazakhstan. From a policy perspective, this result indicates that both policy advisers and governments (local, state and central) should give higher priority to increasing the quantity and quality of investments in the development of the education sector. Increasing the quality of investments in the education sector should enhance the human capital development of the poor, thereby helping them to add their skills to the labour market, which improves the income distribution of the economy. The impact of dummy variable is negative but insignificant on income inequality.

Table 3: Short Run Estimates

Dependent Variable = $\Delta \ln IE_t$			
Variable	Coefficient	t-statistic	p- value
Constant	0.0412*	7.3267	0.0000
$\Delta \ln Y_t$	-0.4813*	-7.0869	0.0000
$\Delta \ln F_t$	0.0473**	2.4870	0.0243
$\Delta \ln FI_t$	0.0023	0.5081	0.6183
$\Delta \ln E_t$	-0.3466*	-3.5513	0.0027
$\Delta \ln D_t$	0.0900*	4.1140	0.0008
$D_{2006}$	-0.0083	-0.5063	0.6195
$ECM_{t-1}$	-0.3456***	-1.7830	0.0936
R-Squared	0.7791		
F-statistic	16.6263*		
Diagnostic Tests			
Test	F-statistic	p- value	
$\chi^2_{NORMAL}$	0.6914	0.7077	
$\chi^2_{SERIAL}$	0.7701	0.5105	
$\chi^2_{ARCH}$	0.6950	0.4143	
$\chi^2_{WHITE}$	0.3525	0.8981	
$\chi^2_{RAMSEY}$	2.1021	0.1509	

Note: IE: income inequality; Y: economic growth; F: financial development; FI: foreign direct investment; E: education; D: democracy; and D2006: time dummy. \*, \*\* and \*\*\* denote the significant at 1%, 5% and 10% level respectively.  $\chi^2_{SERIAL}$  for the LM serial correlation test,  $\chi^2_{ARCH}$  for autoregressive conditional heteroskedasticity and  $\chi^2_{REMSAY}$  for Resay Reset test.

In Table 3, a positive and significant effect is found for democracy on income inequality in Kazakhstan. This result also shows the direct relationship between democracy and income inequality, and is consistent with Simpson (1990) demonstrating theoretically that income inequality increases with increasing democracy in the short-run. From a policy perspective, our findings suggest that government in transition should bring back effective income redistribution in the short-run perhaps by imposing progressive taxation. The effect of FDI on income inequality in the short-run is insignificant for Kazakhstan. This finding is consistent with the findings of Lindert and Williamson (2001) and Milanovic (2002) suggesting no significant relationship between FDI and income inequality. The estimated lagged error correction term, i.e.,  $ECM_{t-1}$ , is -0.3456, indicating that it takes almost three years to complete a full convergence process for adjustment to any shocks to the income inequality in Kazakhstan. Furthermore, the statistical significance of the lagged error term validates the long-run dynamics between income inequality, economic growth, financial development, foreign direct investment, education and democracy.

The results of the diagnostics tests, reported in Table 3, show that both serial correlation and autoregressive conditional heteroskedasticity are not significant, indicating that the short-run model is well formulated.

The long run estimates presented in Table 4 indicate that the signs and significance levels of each of our explanatory variables are similar to the short-run estimates reported in Table 3. The statistical impact of economic growth on income inequality in Table 4 shows that a 1% increase in economic growth causes a 0.27% decrease in income inequality in the long run (representing an improvement in income distribution), while the short run estimate is -0.48 as found in Table 3. This shows that economic growth is negatively and significantly related to income inequality in the long-run, indicating that increasing income levels

improves income distribution. These findings are contradictory to those of Shahbaz (2010) for Pakistan, but consistent with Barro (2000).

The long-run estimate of the relationship between financial development and income inequality is positive and statistically significant. Financial development worsens income inequality, allocating domestic private credit to upper segments of the population in Kazakhstan. A 1% increase in financial development (allocation of domestic credit to the private sector) increases income inequality by 0.09% in the long run. The corresponding short run estimate of 0.047 is reported in Table 3. These findings indicate the greater long-run role of financial development in increasing income inequality in comparison to the short run. This finding is contrary to Law and Tan (2009), Ang (2010). On the other hand, Tiwari *et al.* (2013) for India, Ling-zheng and Xia-hai (2012) for China and Wahid *et al.* (2012) for Bangladesh, establish that financial development impairs income distribution for India, China and Bangladesh respectively. These studies support our empirical evidence.

The findings in Table 4 show the negative and significant impact of foreign direct investment on income inequality in the long-run, indicating the negative relationship between these two factors. A 0.027% decline in income inequality corresponds to a 1% increase in foreign direct investment in the long run.<sup>8</sup> This clearly shows that the Kazakhstan economy is capable of reducing income inequality by allowing foreign capital investment, predominantly in the oil and mineral sectors. As a result, middle and lower segments of the population would enjoy increased opportunities in the labour market, and eventually the income level of lower segments of the population would tend to increase, indicating an improvement in income distribution in Kazakhstan. From a policy point of view, we suggest that economic integration between foreign dominated sectors with other economic activities is needed in the long run.

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<sup>8</sup> The short run results are not reported due to insignificant influence of FDI on IE.

Table 4: Long-run Estimates

Dependent Variable = $\ln IE_t$				
Variables	Coefficient	t-Statistic	Coefficient	t-Statistic
Constant	4.0610*	4.3991	1.8304	1.3246
$\ln Y_t$	-0.2758*	-3.7234	-0.2374*	-3.3535
$\ln F_t$	0.0911*	4.1362	-0.4260**	-2.5858
$\ln F_t^2$	....	....	0.0158***	2.0484
$\ln FI_t$	-0.0271***	-1.9870	-0.0235***	-1.8515
$\ln E_t$	-0.2608***	-2.0506	-0.2220***	-1.8704
$\ln D_t$	0.1348*	4.3196	0.1269*	4.3711
$D_{2006}$	-0.0651**	-2.6044	-0.0541**	-2.0771
Diagnostic Tests				
$R^2$	0.8753		0.9000	
F-statistic	25.2761*		25.5028*	
Stability Test				
Test	F-statistic	p-value	F-statistic	p-value
$\chi^2_{NORMAL}$	3.4431	(0.1787)	0.1356	(0.9344)
$\chi^2_{SERIAL}$	0.3269	(0.5754)	0.7850	(0.3887)
$\chi^2_{ARCH}$	0.9740	(0.3349)	1.9486	(0.1773)
$\chi^2_{WHITE}$	1.9176	(0.1163)	2.3570	(0.0768)
$\chi^2_{RAMSEY}$	2.0226	(0.0678)	2.0070	(0.0711)

Note: IE: income inequality; Y: economic growth; F: financial development; FI: foreign direct investment; E: education; D: democracy; and D2006: time dummy. \*, \*\* and \*\*\* denote the significant at 1%, 5% and 10% level respectively.  $\chi^2_{NORMAL}$  is for normality test,  $\chi^2_{SERIAL}$  for LM serial correlation test,  $\chi^2_{ARCH}$  for autoregressive conditional heteroskedasticity,  $\chi^2_{WHITE}$  for white heteroskedasticity and  $\chi^2_{RAMSEY}$  for Ramsay Reset test.

The role of education is shown to be significant, and has a negative correlation with income inequality. A 0.26% decline in income inequality corresponds to a 1% increase in education, indicating that investment in education reduces income inequality in Kazakhstan in the long-run, while the short-run estimate is -0.34%. Since independence, the government has launched several bold reforms on all levels of education with promising results. However, due to the 1998 economic crisis in Asia and Russia, the effects of these reforms had been slow. Kazakhstan needs to integrate other sectors of the economy with education to maximise the beneficial effects on the overall population and to reduce income inequality. However, the long-run relationship between democracy and income inequality is positive and statistically significant, indicating that democracy plays a vital role in increasing income inequality in Kazakhstan. The added role of democracy is statistically justified by the fact that a 1%



increase in democracy increases income inequality by 0.13%, while the short-run estimate is 0.09 as shown in Table 3. Our findings suggest perhaps that the current democracy is not sufficient to realise the potential for beneficial effects and the reduction of income inequality in Kazakhstan. The dummy variable (oilfields exploration) has negative impact on income inequality. This reflects that the discovery of 'Hope Oilfield' and '100-million-ton oil-bearing structure' in North Troyes have a positive impact on economic activities and affect income inequality indirectly. A consistent rise in oil exports has improved trade balance which ultimately contributed to gross domestic production (GDP) and resulted in increasing economic growth. This has a positive impact on income distribution with less income inequality. The discovery of oilfields has also generated employment opportunities both for skilled and unskilled workers which may have affected income inequality. In future, government may introduce various training programs to improve skills. This will reduce the gap between skilled and unskilled workers and reduce income inequality.

To examine the validity of the GJ hypothesis for Kazakhstan, we also incorporate a square term of financial development ( $\ln F_t^2$ ). The impacts of linear and non-linear terms of financial development on income inequality are -0.426 and 0.015, respectively. This validates the U-shaped long-run relationship between financial development and income inequality in Kazakhstan. Our findings reflect financial development is effective at reducing income inequality up to a threshold level, after which further increases have an increasing effect on income inequality. Within the time span selected, financial development has a positive effect on income inequality. These findings are consistent with Sebastian and Sebastian, (2011) for 138 developed and developing nations, Tan and Law (2012) for Malaysia, and Ling-zheng and Xia-hai (2012) for China, but contrary to the findings by Clarke *et al.* (2006) for 83 developed and developing economies, Batuo *et al.* (2012) for African countries, reported an inverted U-shaped relationship between financial development and income inequality.

It should be noted that all empirical models fulfil the assumptions of the classical linear regression model (CLRM), indicating that there is no non-linearity of the residual term. The absence of serial correlation and autoregressive conditional heteroskedasticity are also established for our models. The test statistic also confirms the correct specification of the functional form of our models.

In the final step of our analysis, we apply the innovative accounting approach (IAA) to establish the strength and direction of causality beyond our sample time period. This approach also considers the feedback effect across variables, and captures the error variance of dependent variable(s) due to shock (or innovation) from both dependent and independent variables beyond the sample time period. The extrapolated information is useful for forecasting purposes for a country such as Kazakhstan which is undergoing transitional changes. In summary, we find that financial development causes income inequality with no feedback effect in the long run. A unidirectional causality runs from economic growth and foreign direct investment to income inequality. A bi-directional causality exists between financial development and economic growth and similar is true for foreign direct investment and economic growth. Economic growth and financial development increase education and financial development increases democracy. The findings from the IAA corroborate the results from the ARDL.<sup>9</sup>

## 5. Conclusion and Policy Suggestions

This paper adds to the existing literature on the relationship between income inequality, financial development, and other controlling factors playing significant role in Kazakhstan

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<sup>9</sup> The findings are available upon request.

during the transition period. Using the longest available time period since independence, we investigate the influence of economic growth, financial development, foreign direct investment, education and democracy on income inequalities since the independence.

Our empirical findings show a unique level of integration between the variables over the time period from 1990 to 2014, with several significant break dates. We have established the presence of long-run dynamics between the variables. Furthermore, economic growth, increased foreign direct investment and spread of education improve income distribution. Conversely, financial development and democracy have a negative effect on income inequality. The empirical absence of the GJ hypothesis in the case of Kazakhstan is established. Instead, the existence of a U-shaped relationship between financial development and income inequality is found. This reflects the fact that financial development narrows income inequality in the early stages of transition. Unfortunately, a threshold exists. Beyond this limit, financial development leads to an increase in income inequality, reflecting an increase in financial market inefficiency. This is a known problem in Kazakhstan, where the financial sector needs to be strengthened for future sustainable development. This is corroborated by the findings from Thomas (2015), where inter and intra-regional inequality have been established since independence.

The findings from this study have important policy relevance for the newly sovereign country of Kazakhstan. In order to decrease income inequality between the rich and poor, the financial sector in Kazakhstan should be socially inclusive over time, leading to benefits for all segments of society. The development of capital markets and greater access to the same is necessary in this respect. The relocation of resources beyond the oil sector, technological innovation and accumulation of human capital are also required to lift the poor and middle class. We suggest that the economy should also diversify its industrial base beyond the oil sector to improve income distribution and job opportunities.

The government should be proactive in formulating macroeconomic policies, including tax reform, and creating trade opportunities beyond the hydrocarbon sector to improve income distribution. Investments in education in an active democratic environment will also further reduce income inequality. The current government's economic policy commonly known as "Nurly Zhol" ( or Bright Path) emphasises on economic growth, role of finance, industry and overall social welfare. Tighter control of national funds, increased economic diversification, investment in human capital, and continuing development of financial sector are some of the key areas needing close attention to reduce inequality in Kazakhstan in the foreseeable future.

On a final note, government should closely monitor the expansion of oil field and oil-exploration. This has both direct and indirect effects on employment, inequality and overall growth of the economy in future. In this respect, financial development, spread of education and foreign investment beyond hydrocarbon sector are necessary in reducing inequality and maintaining sustainable growth of the economy.

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