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Uncertainty and Risk Analysis of Pakistan's Housing Market: Fan Chart Approach

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Abstract: *Economic forecasting is necessary to revise and check the effectiveness of the existing policies. This serves as a pioneer study to forecast house prices (HP), foreign direct investment (FDI), and worker's remittances (WR) using the time series data ranging from 1973 to 2018 on the economy of Pakistan. The analysis is performed on a yearly, quarterly, and monthly basis to present the detailed synthesis. Fan chart methodology is used to forecast growth rates of house price, foreign direct investment, and worker's remittances for ten years 2019-2028. The results of the analysis support the proposition that there is uncertainty associated with house prices. To get beneficial results, the economic managers should carefully design a housing policy so that upside and downside risks are minimized.*

Keywords: Fan Chart, House prices, foreign direct investment, worker's remittances, forecasting, Pakistan.

Introduction

Macroeconomic forecasting plays a crucial role in the decision-making process of any economy by guiding policymakers to pay special attention to volatile components, particularly planning for the housing sector. Regular and timely monitoring of the previous forecasts improves its accuracy which serves public authorities efficiently. The housing sector serves almost the entire economy in this instance, its close monitoring is necessary to avoid any price volatility which can hamper other macroeconomic aggregates. The appreciation of housing prices is a global phenomenon but the world has witnessed the global subprime crisis which disturbed the entire world economic indicators. This is due to imprudent lending, overlooked mortgage procedures by banks and non-bank financial institutions, or the lack of proper planning and forecasting of the future trend. In addition to this Asian financial crisis broke in most Asian countries which also put downward pressure on the global economy. Thailand is the best example where the crisis began and the importance of the real estate sector was almost overlooked (Renaud, Zhang, & Koeberle, 2001). The housing sector has established its prominent position in an economy that cannot be overlooked and

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the debate among researchers and analysts is increasing for the case of the Hong Kong economy (Fung & Forrest, 2002). It is concluded that more open Asian economies suffer more during the crisis period (Chiu, 2006).

Housing is an important sector in the economic performance of a developing country because it serves the residential needs of the individuals in an economy. The gross residential construction is counted in the national accounts of any country, also it can facilitate the workers to have safe cover for their families. Such facilities increase the productivity of households. Pakistan is also a developing economy located in the South Asian region, with a GDP per capita income of US $1197.84 [1]; it is desirous of everybody to have a house to live in but with such a low earning level it is difficult for people to acquire a housing unit. The rapid growth in population and rural to urban migration have put enormous pressure on the housing sector, there is also a problem of housing finance, the role financial sector is minimal hence people rely on informal sources for housing finance. Rapidly rising housing prices and the supply-demand gap in the housing market created instability and caused a disturbance in the overall economic management. This lack of finances for the housing call for the contribution of the foreign capital inflow, people mostly using worker's remittances to finance housing decisions in the country. In addition to this, the impact of foreign direct investment in the housing sector is increasing with time. In this instance, it has become necessary to analyze the behavior of the housing market and its future trend analysis.

Pakistan like most other developing countries is facing a deficit of affordable housing for households whose earning capacity is low, this is especially due to uncontrolled urbanization. The emergence of informal settlements and slums are formed due to the inability of residents to buy an area of land for the construction of houses and lack of public policy for planning the urban settlements. The country's informal settlements constitute about 27 million out of the 207 million total population of the country (Malik, Roosli, & Tariq, 2020). There is a dire need for research in this area to highlight the important points of actions for the public authority to frame a housing policy to cater to the burning problem of housing in the country.

The objective of this current study is to forecast the growth rate of housing prices which is inevitable for economic planning, apart from income, interest rate, and other macroeconomic factors, housing prices are greatly affected by income sources from abroad. The impact of foreign capital inflow and worker's remittances is the motivation of this study. The paper is designed to cater to the objective in this manner, the following section cover related literature on the subject, a fan chart is presented afterward and the paper presents concluding remarks at the end.

Literature Review

Globally, the housing market has gained such importance that it plays a vital role in the macroeconomic fluctuations, it has become an important economic indicator for an economy. When prices of housing increase it caused overheating the economic performance, and declining housing prices indicate a slowdown that is also not desirable and such a

[1] Gross Domestic Product, WDI World Bank 2018

regular up and down in the housing prices is not a healthy economic sign (Leamer, 2007). It is of vital interest to the public at large to learn the ebb and flow of the housing market more efficiently. The dire need of the time is to forecast such movements in the housing prices to design an efficient housing policy.

There is a lot of factors that affect housing prices such as gross domestic product GDP, rate of inflation, money supply, interest rate, and population. Income is the most important factor which affects housing prices, many studies have used income as a potential driver of housing prices (Annett, 2005; McCarthy & Peach, 2004; Meen, 2002). Usually, houses are costly to build or purchase so that one cannot afford to buy from their current income sources albeit everyone wants a house to live in and provide shelter to their offspring too. Houses are financed by banks and non-bank financial institutions around the world so the role of the financial sector is important in housing finances. Given the large capital investment in housing, it is financed through mortgages that in turn are largely governed by interest rates (Himmelberg, Mayer, & Sinai, 2005; Iacoviello, 2002).

The changes in housing prices have been defined by macroeconomic factors, but the main task is to forecast the future trend in the housing market. There are various modeling techniques to forecast house prices, some of them include the error correction model (Malpezzi, 1999), and Kalman filter (Clapp & Giaccotto, 2002). It incorporated generalized autoregressive conditional heteroscedasticity (GARCH) and autoregressive integrated moving average (ARIMA) (Crawford & Fratantoni, 2003); along with these they also used regime-switching models to forecast housing prices. Both the models perform good results, ARIMA is good for out of sample phenomena whereas the regime-switching model is good for the in-sample forecast. Similarly, Monte Carlo simulation is by Giaccotto and Clapp (1992) and they used Bayesian and non-Bayesian methods for the analysis, a similar phenomenon is also found out by Geltner, MacGregor, and Schwann (2003) for the United Kingdom hereafter named the UK.

In another study (Brown, Song, & McGillivray, 1997) showed that the forecasting results of the time-varying coefficient model are better than the vector autoregressive model and error correction mechanism for the economy of the UK. However, Guirguis, Giannikos, and Anderson (2005) used the rolling GARCH and time-varying parameter models for the economy of the United States hereafter named as the UK, to find out the stability of the estimates. These estimates performed well for univariate time series data on house prices for the US economy, are better than the constant time parameters as found out by Brown et al. (1997).

The existing literature on forecasting housing prices for the US and the UK mostly used univariate time series whereas (Kishor & Marfatia, 2018; Mohan, Hutson, MacDonald, & Lin, 2019) used multivariate time series for forecasting the growth of real housing prices along with other variables of interest like disposable income, industrial production, stock returns and interest rates for the 16 Organization of Economic Cooperation and Development countries hereafter named as OECD. Uncertainty is inevitable in any forecasting method, in the case of time series analysis, range forecast is a better measure than point forecasting methods. The range forecasting methods will give the ups and downs in the with the confidence interval about a series instead of a single predicted value. Fan chart was first used by the bank of England in 1996 for the inflation report and it gained atten-

tion afterward. In this study fan chart is used to forecast the housing prices along with FDI and worker's remittances.

Usually, house prices appreciation is attributed to the increased income and population across the globe, apart from this foreign capital inflow plays a vital role, the popular sources are the foreign direct investment and the worker's remittances. The inflow of foreign direct investment in the Chinese housing market showed signs of growth in the housing sector tremendously. This rapid foreign investment in the housing market will overheat the economy by destabilizing the housing prices in the home country if it will not be properly channelized (Hui & Chan, 2014). Similarly, the phenomena of rising housing prices were analyzed by Gholipour (2013) with the vector autoregression VAR model for nine years. The analysis confirmed that due to the inflow of foreign capital housing prices increase and it also increased in the 21 emerging economies.

There is a study conducted by Poon (2017) which has focused on key factors that affect foreign direct investment in the UK economy. It is rich enough to attract much of the tourists around the world so the property prices are not affected by the increase in the number of tourists, domestic income and interest rate are among the key factors which affect the housing prices. Feng, Lin, and Wang (2017) analyzed the impact on FDI and hot money on stock and house prices in China, the results confirmed that positive shock to hot money increased both stock and house prices, whereas the FDI shock increase house prices of the previous years. The OECD countries have experienced growth in foreign direct investment for the last 20 years but the results suggest that the FDI neither increases property price nor stimulates economic growth for short as well as long run (Gholipour, Al-Mulali, & Mohammed, 2014).

The macroeconomic factors other than FDI like interest rate, real effective exchange rate, and stock returns also contribute to the appreciation of the house prices it is found by Mahalik and Mallick (2016) which used variance decomposition from the vector autoregression model for the Indian economy. The role of workers remittances is also significant in the appreciation of the housing prices, by using the quantile regression for the economy of Bangladesh analyzed both domestic and international sources of workers remittances. The house price volatility for the economy of Namibia is tested through autoregressive conditional heteroscedasticity and generalized autoregressive conditional heteroscedasticity. The results reveal that the lagged value of gross domestic product and mortgage caused housing prices to fluctuate (Kaulihowa & Kamati, 2019).

In developing countries, people have lower levels of income just because of a lack of earning sources in the home country. The domestic economy's resources usually cannot employ its masses so people rely on going abroad for earning a handsome amount of money to finance their needs. People search for jobs abroad and the households save their income in a foreign country and spend the amount for necessary expenses along with building a house in the home country. It is one of the proper usage of the worker's remittances earned abroad. This increase in worker's remittances will increase the house building activity and eventually it will lead to house price appreciation in the home country. This has been done in Ghana where the level of income is low and the population is rapidly rising, it has created a housing shortage in the economy (Obeng-Odoom, 2010).

In the urban areas of Pakistan, a study used the hedonic pricing method, which con-

cluded that when permanent income increase it affects housing demand rather than the increase in transitory income because people are reluctant to make purchasing decisions on the volatile income (Ahmad, Iqbal, & Siddiqui, 2018). To forecast housing prices there are many factors both domestic and international which play a crucial role in the housing market. The motivation of the study is to analyze the behavior of the inflow of foreign capital inflow in the housing sector in the economy of Pakistan. The foreign direct investment and worker's remittances are taken into account to jointly forecast their impact on the housing prices.

This is the pioneering study that addresses the issue of forecasting housing prices. To the best of my knowledge, no one has until now tried to work on forecasting the housing prices for the economy of Pakistan. It provides me the novel opportunity to explore the topic firsthand.

Methodology

The problem of uncertainty prevails when any economic indicator is forecasted, despite taking in to account many spheres of forecasting. In this paper, we attempt to forecast house prices along with foreign direct inflow and worker's remittances for the economy of Pakistan. There are two strands related to forecasting point forecast and range forecast, the former will give only a single forecasted value and the latter gives us the range of values that might be used for future forecasting based on the probabilistic information embedded in them. To get the benefits of the high-frequency data we have to decompose the annual data set to a quarterly and monthly basis based on the technique proposed by Chow and Lin (1971).

Being a graphical representation fan charts provide the density forecast. It uses different lines and colorful bands to distinguish between multiple percentiles. The most popular percentiles used in the illustration of an estimated probability distribution of fan charts are the 10th, 30th, 60th, and 90th. These bands increase in size with the increase in uncertainty resultantly the graphical picture gets the shape of wider wings, it is the intuition that makes it popular as a fan chart.

Economic analysts frequently use the fan chart technique for forecasting economic aggregates because of its advantages over other methods. The bank of England used it the first time to forecast inflation in 1996, afterward it gained much popularity and it is used by the International Monetary Fund hereafter named IMF, to forecast many economic variables including the growth rate of the gross domestic product for global economies. This new technique is also used to forecast regional as well as aggregate trade volume of the economy of Pakistan (Jawaid, Waheed, et al., 2017), the current study uses it to forecast housing prices, FDI, and worker's remittances. To produce the fan chart for the housing prices forecast the methodology of Kannan and Elekdag (2009) is used in the following manner.

1. Growth forecast of housing prices λ
2. The historical forecast error variance is denoted by $\delta\lambda$

3. The Pearson skewness is computed as $\gamma\lambda$
4. The confidence interval is chosen at 30, 60, and 90 percent level
5. The 2-piece normal distribution shows variance and skewness parameters (as a central forecast mean is denoted by μ and the left and right standard deviations are shown by δ_1 and δ_2 respectively.

The 2-piece normal distribution density function (with a common mean for both sides of distribution is denoted by μ, and standard deviations for each side is shown by δ_1 and δ_2).

$$f(\lambda) = Aexp\left(-\frac{(\lambda-\mu)^2}{2\delta_1^2}\right) for \lambda \leq \mu \tag{1}$$

$$f(\lambda) = Aexp\left(-\frac{(\lambda-\mu)^2}{2\delta_1^2}\right) for \lambda \leq \mu \tag{2}$$

Where,

$$\frac{\sqrt{2}(\delta_1+\delta_2)^{-1}}{\sqrt{\pi}} \tag{3}$$

The mode of distribution is given by $\mu \neq \delta_1$ and δ_2 prevails if the distribution is skewed. The 2-piece normal distribution mean, variance, and skewness is given by the following equations respectively.

$$E(\lambda) = \mu + \rho(\delta_2 - \delta_1) \tag{4}$$

$$V(\lambda) = \delta_1\delta_2(1-\rho^2)(\delta_2-\delta_1)^2 \tag{5}$$

$$\gamma(\lambda) = \rho(\delta_2-\delta_1)[(2\rho^2-1)(\delta_2-\delta_1)^2] + \delta_1\delta_2 \tag{6}$$

Where,

$$\rho = \sqrt{\frac{2}{\pi}} \tag{7}$$

In equations 4, 5, and 6, the mean E(λ), variance V(λ) and skewness $\gamma(\lambda)$ respectively, shown for the two-piece normal distribution. The two-piece normal distribution skewness coefficient is given by Blix and Sellin (1998) in the following manner:

$$\gamma(\lambda) = \rho(\delta_2 - \delta_1) \tag{8}$$

It has simplified the work in calculating δ_1 and δ_2 as the coefficient of skewness in the 2-piece normal distribution interval for the fan chart. In the equation of variance V(λ) and skewness $\gamma(\lambda)$ we substitute the values for δ_1 and δ_2 we get:

$$\delta_1^2 + \rho\gamma\lambda\delta_1 - [(1-\rho)\gamma\lambda^2 + \delta\lambda^2] = 0 \tag{9}$$

Where $\gamma\lambda$ is estimated skewness and $\delta\lambda$ is the variance of the 2-piece normal distribution. When we find out the standard deviation for the right side δ_1 of the distribution, we can get δ_2 easily by the approximate solution of equation 8.

6. The confidence interval of the estimated point forecast for the variables of interest are drawn by the level of confidence (q), it is given as under:

$$z_1 = \mu - \frac{\delta_1}{\delta_2}(z_2 - \mu) \tag{10}$$

$$z_2 = \mu - \delta_2 \varphi^{-1}(\frac{1+q}{2}) \tag{11}$$

Where φ^{-1} refers to the opposite of standard normal distribution and its range is $(0 < \varphi^{-1} < 1)$. The details can get from Yu (2011); Camilleri and Vella (2015).

Table 1
Descriptive Statistics of variables

Variable	Obs.	Mean	Min.	Max.	Std. Dev.	ADF
HP	46	3.607	1.677	5.313	0.994	-5.026*
FDI	46	0.808	0.046	3.668	0.794	-4.535*
WR	46	5.191	1.454	10.248	2.142	-6.899*

Note: ADF shows the Augmented Dickey-Fuller unit root test.
The single asterisk shows rejection of the null hypothesis at a 1% level of significance.
Source: Author's calculation

The data is available yearly on the variables of interest and it's taken from World Development Indicators, World Bank and Handbook of Statistics, State Bank of Pakistan. Table 1 shows the statistical properties of variables HP, FDI, WR which refers to the house prices, foreign direct investment as a percentage to GDP, worker's remittances as a percentage to GDP respectively. The data on these variables are available on an annual basis but they are converted into a quarterly and monthly basis to attain the benefits of high-frequency data and detailed analysis of the problem at hand.

Fan Chart Analysis:

This section covers the discussion of forecasting house prices along with two sources of foreign capital inflows namely foreign direct investment and worker's remittances in Pakistan. To get the benefits of the high power data, the series is usually available yearly but they were converted on a quarterly and monthly basis.

Figure 1
Fan Chart of House Prices Growth (Annual Data)

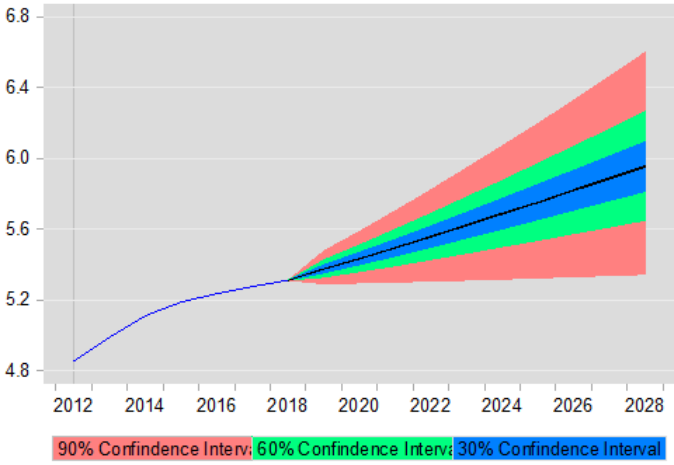


Figure 2
Fan Chart of Foreign Direct Investment Growth Rate (Annual Data)

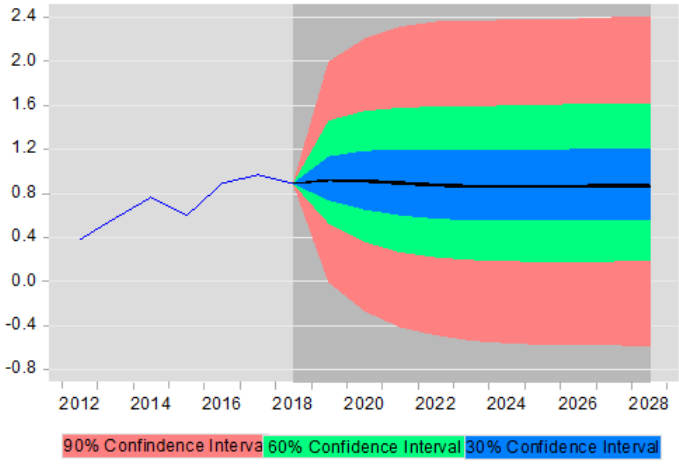
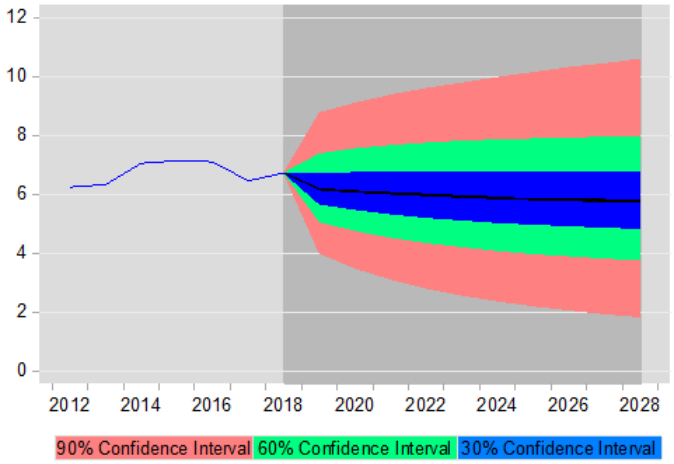


Figure 3
Fan Chart of Worker's Remittances Growth (Annual Data)



Annual Data Analysis:

The growth rate of house prices is stood at 5.63 percent from 2019 to 2028, this shown in Figure 1, 2, 3, and Tables 2, 3, and 4. The upside risk is evident from the coefficient of skewness in all the years of forecast. The average foreign direct investment growth rate stood at 0.88 from 2019 to 2028 and the average growth rate of worker's remittances is 6 percent for the same period. Skewness is showing upside risk in case of foreign direct investment whereas it also shows upside risk for the worker's remittances.

Table 2
Result of Fan Chart of House Prices Growth (Annual Data)

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2019	5.377	0.057	0.299	5.355	5.4	5.332	5.428	5.293	5.479
2020	5.435	0.089	0.184	5.402	5.47	5.363	5.512	5.298	5.589
2021	5.496	0.123	0.125	5.45	5.544	5.396	5.6	5.303	5.705
2022	5.559	0.158	0.086	5.5	5.62	5.431	5.691	5.308	5.825
2023	5.624	0.193	0.075	5.552	5.697	5.466	5.783	5.315	5.948
2024	5.69	0.229	0.058	5.604	5.776	5.503	5.877	5.319	6.073
2025	5.753	0.266	0.069	5.657	5.855	5.54	5.974	5.327	6.2
2026	5.822	0.304	0.069	5.71	5.935	5.577	6.07	5.333	6.332
2027	5.889	0.342	0.086	5.764	6.015	5.614	6.168	5.341	6.466
2028	5.957	0.381	0.1	5.816	6.095	5.652	6.266	5.347	6.602

Source: Author's estimation

Table 3
Result of Fan Chart of Foreign Direct Investment Growth (Annual Data)

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2019	0.922	0.6	0.207	0.743	1.13	0.528	1.456	-0.006	1.995
2020	0.913	0.744	0.138	0.659	1.182	0.364	1.543	-0.263	2.201
2021	0.895	0.821	0.126	0.608	1.19	0.271	1.573	-0.411	2.308
2022	0.877	0.856	0.134	0.578	1.185	0.225	1.581	-0.483	2.355
2023	0.864	0.874	0.105	0.563	1.185	0.202	1.586	-0.532	2.362
2024	0.863	0.883	0.09	0.561	1.187	0.191	1.593	-0.554	2.371
2025	0.865	0.89	0.07	0.561	1.193	0.184	1.601	-0.569	2.375
2026	0.866	0.893	0.065	0.566	1.197	0.182	1.605	-0.574	2.38
2027	0.87	0.896	0.074	0.565	1.204	0.188	1.609	-0.573	2.394
2028	0.869	0.9	0.068	0.564	1.201	0.192	1.611	-0.585	2.4

Source: Author's estimation

Table 4
Result of Fan Chart of Worker's Remittances Growth (Annual Data)

Year	Growth Rate	St. Deviation	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2019	6.171	1.44	0.297	5.668	6.688	5.074	7.365	4.003	8.76
2020	6.092	1.704	0.226	5.489	6.733	4.771	7.544	3.494	9.089
2021	6.031	1.906	0.213	5.339	6.753	4.541	7.646	3.112	9.367
2022	5.977	2.067	0.217	5.218	6.74	4.363	7.731	2.81	9.592
2023	5.919	2.194	0.223	5.128	6.744	4.22	7.793	2.571	9.771
2024	5.876	2.31	0.252	5.041	6.733	4.089	7.84	2.376	9.964
2025	5.819	2.411	0.28	4.982	6.739	3.984	7.873	2.208	10.136
2026	5.813	2.498	0.301	4.935	6.733	3.915	7.905	2.071	10.307
2027	5.789	2.575	0.308	4.879	6.734	3.827	7.927	1.934	10.431
2028	5.764	2.648	0.343	4.845	6.734	3.771	7.953	1.838	10.589

Source: Author's estimation

Quarterly Data Analysis:

In the case of quarterly data, the growth rate of house prices stood at 5.59 percent from 2018Q2 to 2028Q4, it is shown in Figures 4, 5, and 6. Tables 5, 6, and 7 shows the results of HP, FDI, and WR respectively [2]. The coefficient of skewness is positive except for the 3rd and 4th quarter of 2018; the 4th quarter of 2023 through the 2nd quarter of 2028 showed a negative sign of the coefficient. These particular negative magnitude quarters show downside risk except for the rest of the positive periods. The average growth rate of foreign direct investment is 0.85 percent from 2018Q2 to 2028Q4 however, the growth rate of worker's remittances is 6 percent for the same sample. Skewness is negative for all the periods for the growth rate of foreign direct investment except 3 quarters of the year 2018 which shows downside risk for the entire period of forecast. However, in case the growth rate of worker's remittances skewness shows positive values except for 2018Q2 to 2019Q2 that period showed a negative value of the coefficient of skewness which is associated with downside risk.

[2]Tables are given in Appendix 1.

Figure 4
Fan Chart of House Prices Growth Rate (Quarterly Data)

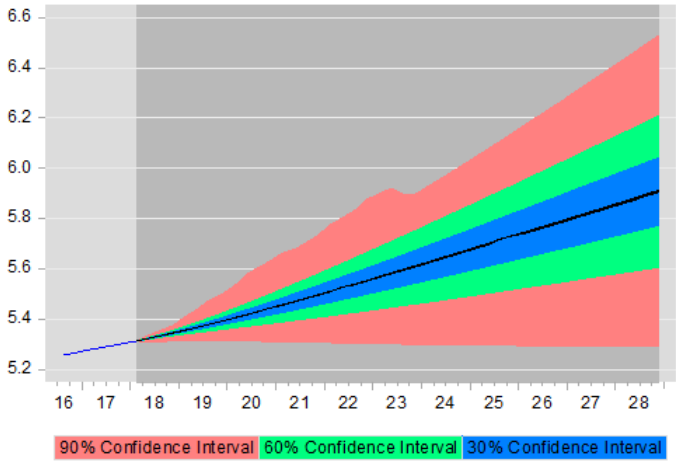


Figure 5
Fan Chart of Foreign Direct Investment Growth Rate (Quarterly Data)

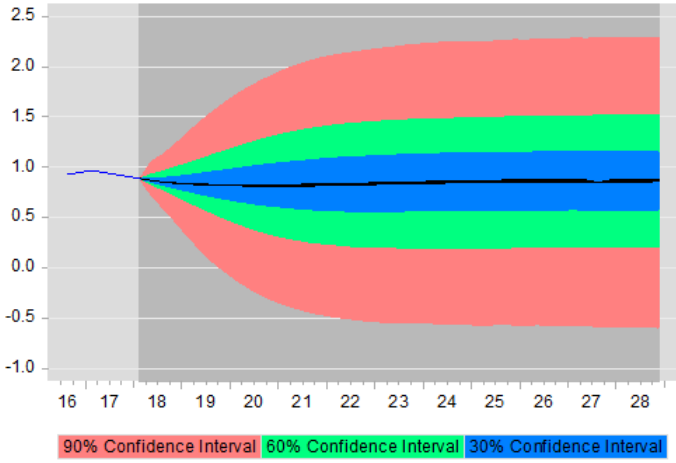
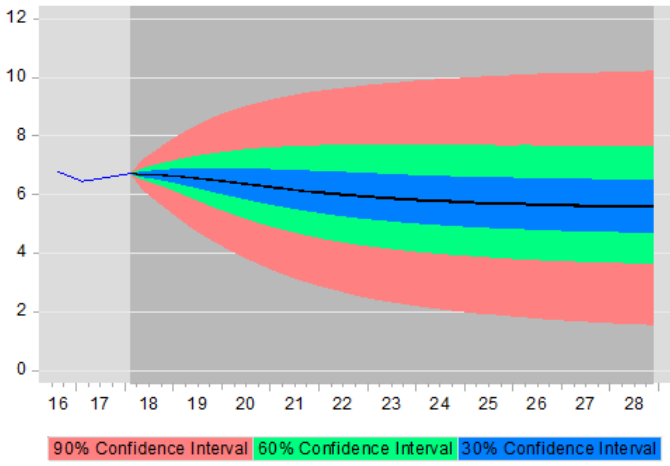


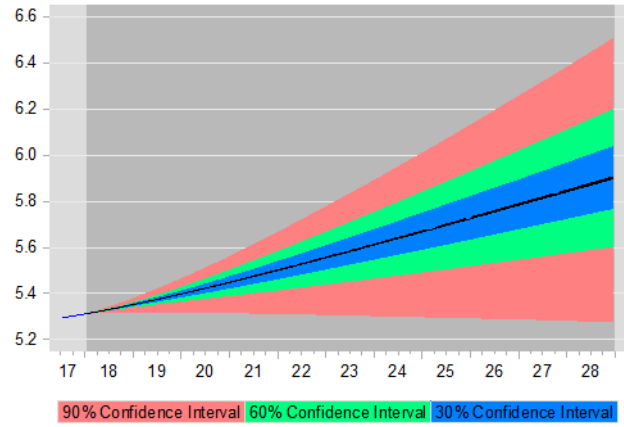
Figure 6
Fan Chart of Worker's Remittances of Growth Rate (Quarterly Data)



Monthly Data Analysis:

The analysis of monthly data shows that the growth rate of house prices is 5.59 percent from February 2018 to December 2028, this is reported in Figures 7, 8, and 9. Tables 8, 9, and 10 shows the results of HP, FDI and WR respectively [3]. The downside risk is evident from the negative value of skewness for the entire period. The average growth rate of foreign direct investment is 0.85 percent from 2nd month of 2018 to 12th month of 2028, the skewness is positive in the first 2 months of 2018 and from 1st month of 2025 till the end, except for the period of 4th month 2018 to 12th month of 2024 which shows negative value.

Figure 7
Fan Chart of House Prices Growth Rate (Monthly Data)



[3]Tables are given in Appendix 1.

Whereas the average growth rate of worker's remittances is 6.04 percent for the same period under study, the skewness is negative from the 2nd month of 2018 to the 3rd month of 2020 and positive from the 4th month of 2020 till the end of the period.

Figure 8
Fan Chart of Foreign Direct Investment Growth Rate (Monthly Data)

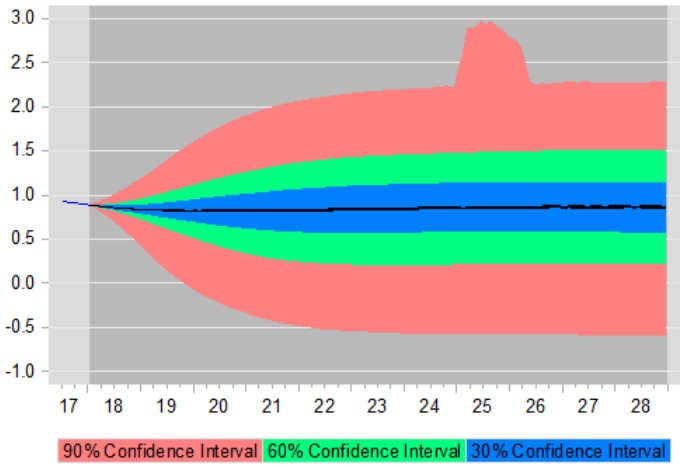
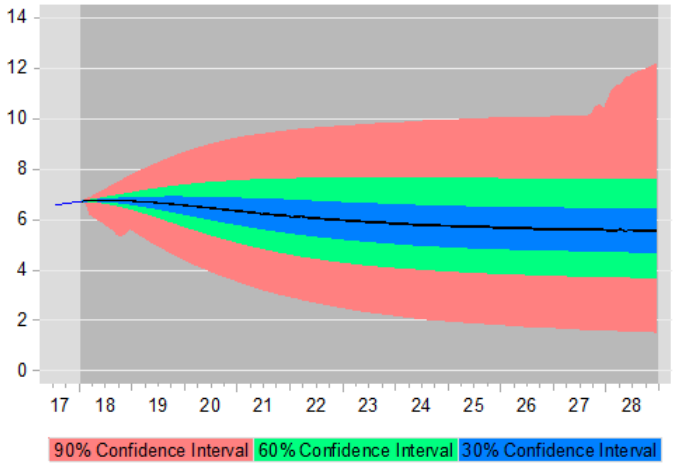


Figure 9
Fan Chart of Worker's Remittances Growth (Monthly Data)



Conclusion and Policy Recommendations:

The study compiles a combined analysis of yearly, quarterly, and monthly data for the growth rates of housing prices, foreign direct investment, and worker's remittances for the

economy of Pakistan. The forecasting is done from 2019 to 2028 based on the sample data available from 1973 to 2018. This is the pioneering study that addressed the forecasting of housing prices and foreign capital inflow in Pakistan. Fan chart is used for forecasting it tells us not only the future forecasted value but also the uncertainty associated with that forecasted value. The advantage of using a range forecasting method like Fan Chart is that it provides upside and downside risk associated with the decision.

The house prices grew at 5.63 percent annually which is slightly higher than quarterly and monthly analysis. The foreign direct investment will grow with the same rate in the three strands of analysis at 0.85 percent. Similarly, the growth rate of worker's remittances stood at 6 percent and it is also the same in the annual, quarterly, and monthly analysis. The skewness showed upside risk in forecasting the housing prices annually, it showed negative in some quarters in the middle and end of the sample forecast, but it reported downside risk during monthly analysis. It has become volatile to invest in the housing sectors like investing stock market. The behavior of the foreign capital inflow is almost similar for both foreign direct investment and worker's remittances. Skewness for both the variables showed upside risk in annual analysis, while the quarterly data showed downside risk for the entire period except 3 quarters of 2018; monthly analysis showed mixed results.

The policymakers should plan in such a way that the inflow of foreign capital is encouraged as it serves as the income source for the economy. This inflow of foreign capital will also benefit as a multiplier effect on other ancillary sectors related to the housing. Housing is an important sector its development is directly related to the growth of gross domestic product through gross residential construction. There is only upside risk in annual data otherwise quarterly and monthly data shows downside risk, this phenomenon compels public authorities to pay attention to the housing sector, its upside risk can be minimized with policy directives as it shows downside risk with the close breakup.

The government of Pakistan should make a housing policy regularly which has not been carried out for a long time so that it should devise ways to invest in the housing sector. Its aim should be clear and it gives proper channels through which foreign funds are invested in the housing sector. There is a dire need of time to establish a separate institution in the form of a bank dedicated to the purpose of housing finance which conducts surveys and advises the government about the financing needs in various cities. The House Building Finance Company Limited is working but there is more area to be covered.

This analysis of the housing sector can be performed for domestic and commercial units separately and it will serve for further research. There is a huge potential in the housing sector to contribute substantially to the economic development of the country.

Appendix 1

Table 5
Result of Fan Chart of House Price Growth (Quarterly Data)

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2018Q2	5.324	0.007	0.016	5.322	5.325	5.32	5.327	5.311	5.337
2018Q3	5.334	0.012	-0.101	5.331	5.337	5.328	5.34	5.312	5.355
2018Q4	5.345	0.017	-0.172	5.341	5.349	5.334	5.355	5.313	5.374
2019Q1	5.356	0.027	0.57	5.35	5.362	5.341	5.371	5.314	5.411
2019Q2	5.368	0.036	0.639	5.359	5.376	5.347	5.388	5.314	5.439
2019Q3	5.379	0.047	0.851	5.368	5.391	5.353	5.405	5.314	5.476
2019Q4	5.392	0.053	0.658	5.378	5.405	5.359	5.423	5.313	5.498
2020Q1	5.404	0.063	0.703	5.387	5.42	5.365	5.442	5.313	5.53
2020Q2	5.417	0.076	0.896	5.397	5.436	5.371	5.46	5.312	5.576
2020Q3	5.43	0.085	0.846	5.407	5.452	5.377	5.48	5.312	5.605
2020Q4	5.444	0.093	0.732	5.417	5.468	5.383	5.499	5.311	5.631
2021Q1	5.456	0.102	0.729	5.427	5.484	5.389	5.519	5.311	5.662
2021Q2	5.469	0.108	0.54	5.437	5.501	5.395	5.54	5.31	5.677
2021Q3	5.483	0.116	0.493	5.447	5.518	5.402	5.56	5.309	5.705
2021Q4	5.497	0.126	0.481	5.457	5.535	5.408	5.581	5.308	5.736
2022Q1	5.511	0.138	0.549	5.468	5.552	5.414	5.602	5.307	5.777
2022Q2	5.528	0.146	0.475	5.478	5.569	5.421	5.623	5.306	5.804
2022Q3	5.539	0.156	0.477	5.489	5.586	5.427	5.644	5.306	5.834
2022Q4	5.553	0.168	0.543	5.5	5.603	5.434	5.665	5.305	5.877
2023Q1	5.568	0.175	0.451	5.511	5.621	5.441	5.687	5.304	5.898
2023Q2	5.581	0.183	0.393	5.521	5.638	5.447	5.709	5.302	5.921
2023Q3	5.596	0.178	0.046	5.532	5.656	5.454	5.73	5.301	5.896
2023Q4	5.61	0.181	-0.12	5.544	5.674	5.461	5.752	5.3	5.897
2024Q1	5.625	0.19	-0.11	5.555	5.692	5.468	5.775	5.3	5.928
2024Q2	5.639	0.199	-0.11	5.566	5.71	5.475	5.797	5.299	5.957
2024Q3	5.654	0.209	-0.103	5.577	5.728	5.482	5.819	5.299	5.987
2024Q4	5.669	0.218	-0.097	5.588	5.746	5.489	5.842	5.298	6.017
2025Q1	5.684	0.228	-0.093	5.6	5.765	5.496	5.864	5.298	6.048
2025Q2	5.699	0.237	-0.089	5.611	5.783	5.504	5.886	5.297	6.078
2025Q3	5.718	0.247	-0.1	5.622	5.801	5.511	5.909	5.297	6.109
2025Q4	5.732	0.256	-0.091	5.634	5.82	5.518	5.931	5.296	6.141
2026Q1	5.743	0.266	-0.068	5.645	5.838	5.526	5.954	5.295	6.172
2026Q2	5.758	0.276	-0.064	5.657	5.856	5.533	5.977	5.294	6.204
2026Q3	5.773	0.285	-0.056	5.668	5.875	5.54	6	5.294	6.235
2026Q4	5.787	0.295	-0.049	5.679	5.894	5.547	6.023	5.294	6.266
2027Q1	5.802	0.305	-0.036	5.691	5.912	5.555	6.046	5.294	6.299
2027Q2	5.818	0.314	-0.029	5.702	5.931	5.563	6.069	5.294	6.331
2027Q3	5.832	0.325	-0.024	5.714	5.949	5.569	6.092	5.292	6.364
2027Q4	5.847	0.335	-0.02	5.726	5.968	5.577	6.115	5.292	6.396
2028Q1	5.862	0.345	-0.012	5.738	5.986	5.585	6.138	5.291	6.429
2028Q2	5.877	0.354	-0.005	5.749	6.004	5.592	6.161	5.291	6.461
2028Q3	5.893	0.365	0.001	5.761	6.023	5.599	6.184	5.291	6.495
2028Q4	5.908	0.375	0.012	5.773	6.042	5.606	6.208	5.291	6.528

Source: Author's estimation

Table 6
Result of Fan Chart of Foreign Direct Investment Growth (Quarterly Data)

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2018Q2	0.868	0.099	0.365	0.851	0.892	0.828	0.933	0.711	1.061
2018Q3	0.852	0.158	0.02	0.82	0.898	0.774	0.965	0.583	1.137
2018Q4	0.843	0.227	-0.059	0.79	0.907	0.716	1.003	0.448	1.238
2019Q1	0.835	0.299	-0.101	0.761	0.921	0.656	1.041	0.309	1.347
2019Q2	0.829	0.369	-0.106	0.733	0.938	0.599	1.081	0.179	1.456
2019Q3	0.825	0.433	-0.124	0.707	0.956	0.544	1.123	0.061	1.553
2019Q4	0.823	0.489	-0.11	0.685	0.972	0.493	1.162	-0.035	1.641
2020Q1	0.821	0.54	-0.099	0.664	0.989	0.444	1.201	-0.122	1.723
2020Q2	0.82	0.587	-0.094	0.644	1.005	0.4	1.238	-0.2	1.796
2020Q3	0.82	0.627	-0.09	0.628	1.022	0.362	1.275	-0.266	1.86
2020Q4	0.82	0.663	-0.08	0.614	1.035	0.329	1.308	-0.322	1.918
2021Q1	0.821	0.694	-0.065	0.602	1.047	0.301	1.338	-0.368	1.971
2021Q2	0.821	0.72	-0.053	0.591	1.059	0.279	1.36	-0.405	2.016
2021Q3	0.823	0.743	-0.046	0.582	1.07	0.258	1.383	-0.438	2.055
2021Q4	0.825	0.762	-0.04	0.573	1.083	0.243	1.401	-0.465	2.089
2022Q1	0.827	0.776	-0.042	0.569	1.092	0.232	1.418	-0.485	2.112
2022Q2	0.83	0.788	-0.044	0.565	1.099	0.221	1.431	-0.504	2.133
2022Q3	0.834	0.798	-0.041	0.563	1.106	0.211	1.442	-0.514	2.15
2022Q4	0.837	0.808	-0.052	0.562	1.11	0.209	1.448	-0.534	2.166
2023Q1	0.839	0.814	-0.044	0.563	1.115	0.204	1.458	-0.539	2.183
2023Q2	0.842	0.821	-0.046	0.564	1.122	0.203	1.465	-0.549	2.197
2023Q3	0.844	0.826	-0.032	0.566	1.126	0.199	1.472	-0.548	2.212
2023Q4	0.847	0.83	-0.025	0.567	1.13	0.198	1.477	-0.549	2.223
2024Q1	0.851	0.833	-0.018	0.571	1.134	0.197	1.482	-0.548	2.233
2024Q2	0.852	0.838	-0.029	0.573	1.138	0.197	1.484	-0.56	2.241
2024Q3	0.856	0.839	-0.038	0.574	1.142	0.197	1.486	-0.562	2.243
2024Q4	0.857	0.842	-0.033	0.576	1.144	0.199	1.491	-0.564	2.252
2025Q1	0.86	0.843	-0.045	0.575	1.143	0.196	1.493	-0.569	2.249
2025Q2	0.859	0.843	-0.039	0.577	1.145	0.198	1.496	-0.566	2.252
2025Q3	0.862	0.844	-0.03	0.577	1.145	0.199	1.499	-0.563	2.259
2025Q4	0.862	0.847	-0.026	0.578	1.147	0.204	1.502	-0.566	2.269
2026Q1	0.864	0.848	-0.033	0.576	1.149	0.202	1.505	-0.568	2.267
2026Q2	0.863	0.848	-0.024	0.576	1.152	0.204	1.508	-0.565	2.271
2026Q3	0.865	0.853	-0.028	0.577	1.152	0.203	1.512	-0.575	2.28
2026Q4	0.864	0.852	-0.028	0.579	1.151	0.204	1.513	-0.571	2.277
2027Q1	0.865	0.854	-0.031	0.58	1.153	0.207	1.512	-0.578	2.284
2027Q2	0.865	0.854	-0.032	0.577	1.153	0.21	1.511	-0.577	2.282
2027Q3	0.847	0.856	-0.011	0.575	1.156	0.211	1.515	-0.58	2.285
2027Q4	0.864	0.856	-0.037	0.575	1.156	0.211	1.517	-0.584	2.285
2028Q1	0.864	0.858	-0.033	0.575	1.157	0.21	1.514	-0.586	2.289
2028Q2	0.866	0.858	-0.033	0.575	1.156	0.209	1.515	-0.585	2.29
2028Q3	0.867	0.86	-0.033	0.575	1.154	0.207	1.517	-0.589	2.294
2028Q4	0.869	0.861	-0.043	0.574	1.154	0.206	1.519	-0.594	2.292

Source: Author's estimation

Table 7
Result of Fan Chart of Worker's Remittances Growth (Quarterly Data)

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2018Q2	6.69	0.294	-0.099	6.616	6.769	6.521	6.89	6.171	7.194
2018Q3	6.679	0.474	-0.132	6.552	6.814	6.391	7.001	5.837	7.48
2018Q4	6.652	0.652	-0.088	6.473	6.845	6.238	7.1	5.509	7.76
2019Q1	6.622	0.824	-0.053	6.382	6.868	6.073	7.192	5.192	8.022
2019Q2	6.58	0.986	-0.018	6.286	6.883	5.9	7.273	4.89	8.261
2019Q3	6.532	1.13	0.027	6.189	6.891	5.731	7.344	4.626	8.473
2019Q4	6.486	1.261	0.06	6.086	6.892	5.566	7.405	4.386	8.654
2020Q1	6.44	1.381	0.067	5.993	6.893	5.412	7.458	4.152	8.811
2020Q2	6.389	1.492	0.081	5.897	6.887	5.26	7.507	3.938	8.949
2020Q3	6.339	1.587	0.096	5.81	6.877	5.123	7.544	3.751	9.067
2020Q4	6.288	1.676	0.105	5.723	6.859	4.996	7.578	3.569	9.17
2021Q1	6.235	1.761	0.111	5.64	6.845	4.881	7.603	3.391	9.266
2021Q2	6.188	1.834	0.115	5.568	6.829	4.776	7.629	3.236	9.346
2021Q3	6.126	1.903	0.138	5.493	6.81	4.678	7.638	3.093	9.43
2021Q4	6.098	1.963	0.139	5.427	6.797	4.587	7.652	2.969	9.497
2022Q1	6.057	2.016	0.139	5.365	6.781	4.5	7.669	2.851	9.544
2022Q2	6.019	2.063	0.152	5.309	6.765	4.428	7.673	2.753	9.601
2022Q3	5.984	2.113	0.146	5.258	6.747	4.359	7.678	2.632	9.647
2022Q4	5.953	2.157	0.149	5.206	6.73	4.295	7.685	2.533	9.692
2023Q1	5.92	2.196	0.164	5.165	6.708	4.242	7.687	2.455	9.746
2023Q2	5.889	2.226	0.165	5.13	6.69	4.195	7.688	2.378	9.772
2023Q3	5.859	2.256	0.178	5.089	6.67	4.144	7.679	2.315	9.807
2023Q4	5.836	2.286	0.191	5.055	6.655	4.098	7.677	2.256	9.85
2024Q1	5.81	2.317	0.204	5.024	6.641	4.055	7.666	2.191	9.898
2024Q2	5.791	2.337	0.203	4.997	6.628	4.015	7.663	2.141	9.91
2024Q3	5.776	2.361	0.203	4.97	6.612	3.982	7.666	2.085	9.936
2024Q4	5.755	2.382	0.208	4.946	6.596	3.951	7.668	2.038	9.957
2025Q1	5.734	2.402	0.207	4.919	6.588	3.924	7.662	1.985	9.976
2025Q2	5.707	2.423	0.225	4.9	6.581	3.897	7.661	1.95	10.014
2025Q3	5.701	2.44	0.232	4.877	6.574	3.872	7.659	1.921	10.041
2025Q4	5.688	2.455	0.229	4.862	6.565	3.844	7.656	1.881	10.053
2026Q1	5.69	2.473	0.226	4.845	6.558	3.818	7.659	1.846	10.074
2026Q2	5.662	2.487	0.233	4.829	6.548	3.797	7.661	1.81	10.089
2026Q3	5.654	2.505	0.237	4.814	6.544	3.78	7.656	1.775	10.117
2026Q4	5.646	2.522	0.241	4.796	6.533	3.77	7.656	1.738	10.144
2027Q1	5.633	2.525	0.235	4.784	6.525	3.75	7.657	1.719	10.132
2027Q2	5.626	2.534	0.236	4.766	6.516	3.734	7.656	1.698	10.136
2027Q3	5.614	2.542	0.235	4.755	6.511	3.719	7.653	1.673	10.14
2027Q4	5.611	2.555	0.237	4.748	6.504	3.705	7.655	1.648	10.161
2028Q1	5.602	2.562	0.237	4.743	6.499	3.689	7.642	1.627	10.167
2028Q2	5.598	2.568	0.24	4.735	6.496	3.684	7.643	1.616	10.179
2028Q3	5.59	2.577	0.238	4.728	6.5	3.68	7.641	1.592	10.189
2028Q4	5.585	2.588	0.245	4.722	6.497	3.659	7.639	1.577	10.212

Source: Author's estimation

Table 8
Result of Fan Chart of House Price Growth (Monthly Data)

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2018M02	5.316	0.001	-1.272	5.316	5.316	5.316	5.316	5.315	5.317
2018M03	5.319	0.001	-0.784	5.319	5.32	5.319	5.32	5.316	5.322
2018M04	5.323	0.003	-0.476	5.322	5.323	5.322	5.324	5.317	5.327
2018M05	5.326	0.004	-0.4	5.325	5.326	5.324	5.327	5.318	5.333
2018M06	5.329	0.005	-0.343	5.328	5.33	5.327	5.331	5.319	5.338
2018M07	5.333	0.007	-0.325	5.332	5.334	5.33	5.335	5.319	5.344
2018M08	5.336	0.008	-0.316	5.335	5.337	5.332	5.339	5.32	5.35
2018M09	5.34	0.01	-0.331	5.338	5.341	5.335	5.344	5.321	5.356
2018M10	5.343	0.012	-0.349	5.341	5.345	5.337	5.348	5.321	5.362
2018M11	5.347	0.013	-0.338	5.344	5.349	5.34	5.353	5.321	5.369
2018M12	5.35	0.015	-0.355	5.347	5.353	5.342	5.358	5.321	5.375
2019M01	5.354	0.017	-0.36	5.35	5.358	5.344	5.363	5.321	5.381
2019M02	5.358	0.019	-0.372	5.353	5.362	5.346	5.368	5.321	5.388
2019M03	5.361	0.021	-0.377	5.356	5.366	5.349	5.373	5.321	5.395
2019M04	5.365	0.023	-0.327	5.359	5.371	5.351	5.378	5.321	5.402
2019M05	5.369	0.025	-0.368	5.363	5.375	5.353	5.384	5.322	5.409
2019M06	5.373	0.027	-0.371	5.366	5.38	5.355	5.389	5.321	5.416
2019M07	5.377	0.029	-0.369	5.369	5.384	5.357	5.395	5.321	5.423
2019M08	5.381	0.032	-0.375	5.372	5.389	5.359	5.4	5.321	5.43
2019M09	5.385	0.034	-0.369	5.375	5.394	5.361	5.406	5.321	5.437
2019M10	5.389	0.036	-0.366	5.378	5.398	5.363	5.412	5.321	5.445
2019M11	5.393	0.038	-0.36	5.381	5.403	5.365	5.418	5.321	5.452
2019M12	5.397	0.041	-0.353	5.384	5.408	5.367	5.423	5.32	5.46
2020M01	5.401	0.043	-0.349	5.388	5.413	5.369	5.429	5.32	5.468
2020M02	5.405	0.046	-0.342	5.391	5.418	5.371	5.435	5.32	5.475
2020M03	5.409	0.048	-0.346	5.394	5.423	5.373	5.441	5.319	5.483
2020M04	5.413	0.051	-0.339	5.397	5.428	5.375	5.448	5.319	5.491
2020M05	5.417	0.053	-0.334	5.4	5.433	5.377	5.454	5.319	5.499
2020M06	5.421	0.056	-0.33	5.403	5.438	5.379	5.46	5.319	5.507
2020M07	5.425	0.058	-0.326	5.407	5.444	5.381	5.466	5.318	5.515
2020M08	5.43	0.061	-0.324	5.41	5.449	5.383	5.473	5.318	5.523
2020M09	5.434	0.063	-0.319	5.413	5.454	5.385	5.479	5.318	5.531
2020M10	5.438	0.066	-0.314	5.416	5.459	5.387	5.485	5.318	5.539
2020M11	5.442	0.069	-0.306	5.42	5.465	5.389	5.492	5.318	5.548
2020M12	5.447	0.071	-0.298	5.423	5.47	5.391	5.499	5.317	5.556
2021M01	5.451	0.074	-0.299	5.426	5.475	5.393	5.505	5.317	5.564
2021M02	5.456	0.077	-0.293	5.43	5.481	5.395	5.512	5.317	5.573
2021M03	5.46	0.079	-0.288	5.433	5.486	5.397	5.518	5.317	5.581
2021M04	5.464	0.082	-0.282	5.436	5.492	5.399	5.525	5.316	5.59
2021M05	5.469	0.085	-0.276	5.439	5.497	5.401	5.532	5.316	5.599
2021M06	5.473	0.087	-0.271	5.443	5.502	5.403	5.538	5.316	5.607
2021M07	5.478	0.09	-0.264	5.446	5.508	5.405	5.545	5.316	5.616
2021M08	5.482	0.093	-0.261	5.45	5.513	5.407	5.551	5.316	5.625
2021M09	5.486	0.096	-0.257	5.453	5.519	5.409	5.558	5.315	5.634
2021M10	5.491	0.099	-0.251	5.456	5.524	5.411	5.565	5.315	5.642
2021M11	5.495	0.101	-0.247	5.46	5.53	5.413	5.572	5.315	5.652
2021M12	5.5	0.104	-0.246	5.463	5.536	5.415	5.579	5.314	5.66
2022M01	5.504	0.107	-0.238	5.467	5.541	5.417	5.585	5.314	5.67
2022M02	5.509	0.11	-0.239	5.47	5.547	5.419	5.592	5.313	5.679
2022M03	5.513	0.113	-0.239	5.473	5.553	5.421	5.599	5.313	5.688
2022M04	5.518	0.116	-0.232	5.477	5.558	5.424	5.606	5.312	5.697
2022M05	5.521	0.119	-0.218	5.48	5.564	5.426	5.613	5.312	5.706
2022M06	5.527	0.122	-0.228	5.484	5.57	5.428	5.62	5.312	5.715
2022M07	5.53	0.125	-0.209	5.487	5.575	5.43	5.627	5.311	5.725
2022M08	5.536	0.128	-0.22	5.491	5.581	5.432	5.634	5.311	5.734
2022M09	5.541	0.131	-0.218	5.494	5.587	5.434	5.641	5.311	5.743
2022M10	5.545	0.134	-0.213	5.498	5.593	5.436	5.648	5.31	5.753
2022M11	5.55	0.137	-0.212	5.502	5.599	5.438	5.655	5.31	5.762
2022M12	5.552	0.14	-0.194	5.505	5.605	5.441	5.662	5.31	5.771

Table 8
Cont'd

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2023M01	5.559	0.143	-0.206	5.509	5.61	5.443	5.669	5.309	5.781
2023M02	5.564	0.146	-0.207	5.512	5.616	5.445	5.677	5.309	5.79
2023M03	5.568	0.149	-0.203	5.516	5.622	5.447	5.684	5.308	5.8
2023M04	5.571	0.152	-0.188	5.519	5.628	5.449	5.691	5.308	5.809
2023M05	5.576	0.155	-0.189	5.523	5.634	5.451	5.698	5.307	5.819
2023M06	5.579	0.158	-0.176	5.526	5.64	5.453	5.705	5.307	5.829
2023M07	5.587	0.161	-0.19	5.53	5.645	5.456	5.712	5.307	5.838
2023M08	5.59	0.164	-0.18	5.534	5.651	5.458	5.72	5.306	5.848
2023M09	5.595	0.167	-0.184	5.537	5.657	5.46	5.727	5.306	5.857
2023M10	5.601	0.17	-0.189	5.541	5.663	5.462	5.734	5.306	5.866
2023M11	5.606	0.173	-0.188	5.545	5.669	5.464	5.741	5.305	5.876
2023M12	5.61	0.176	-0.181	5.548	5.675	5.466	5.748	5.305	5.886
2024M01	5.615	0.179	-0.184	5.552	5.681	5.469	5.756	5.304	5.895
2024M02	5.62	0.182	-0.18	5.555	5.687	5.471	5.763	5.304	5.905
2024M03	5.625	0.185	-0.178	5.559	5.692	5.473	5.77	5.303	5.915
2024M04	5.63	0.189	-0.174	5.562	5.698	5.475	5.778	5.303	5.925
2024M05	5.634	0.192	-0.173	5.566	5.704	5.477	5.785	5.302	5.935
2024M06	5.639	0.195	-0.169	5.569	5.71	5.48	5.792	5.302	5.945
2024M07	5.644	0.198	-0.164	5.573	5.716	5.482	5.8	5.302	5.954
2024M08	5.645	0.201	-0.149	5.577	5.722	5.484	5.807	5.301	5.964
2024M09	5.653	0.204	-0.162	5.58	5.728	5.486	5.814	5.301	5.974
2024M10	5.658	0.207	-0.159	5.584	5.734	5.489	5.822	5.301	5.984
2024M11	5.663	0.21	-0.158	5.588	5.74	5.491	5.829	5.301	5.994
2024M12	5.667	0.213	-0.154	5.591	5.746	5.493	5.836	5.3	6.003
2025M01	5.673	0.217	-0.155	5.595	5.752	5.495	5.844	5.3	6.013
2025M02	5.675	0.22	-0.141	5.598	5.758	5.498	5.851	5.299	6.023
2025M03	5.677	0.223	-0.129	5.602	5.764	5.5	5.858	5.299	6.034
2025M04	5.685	0.226	-0.139	5.606	5.77	5.502	5.865	5.298	6.044
2025M05	5.691	0.229	-0.145	5.609	5.776	5.504	5.873	5.298	6.054
2025M06	5.696	0.232	-0.142	5.613	5.782	5.506	5.88	5.298	6.064
2025M07	5.701	0.236	-0.136	5.617	5.788	5.509	5.887	5.298	6.074
2025M08	5.706	0.239	-0.137	5.62	5.794	5.511	5.895	5.297	6.084
2025M09	5.711	0.242	-0.132	5.624	5.8	5.514	5.902	5.297	6.095
2025M10	5.715	0.245	-0.13	5.628	5.806	5.516	5.91	5.296	6.105
2025M11	5.72	0.249	-0.126	5.631	5.812	5.518	5.917	5.296	6.116
2025M12	5.72	0.252	-0.106	5.635	5.818	5.52	5.925	5.295	6.126
2026M01	5.73	0.255	-0.128	5.639	5.824	5.523	5.932	5.294	6.136
2026M02	5.735	0.258	-0.123	5.642	5.83	5.525	5.94	5.294	6.146
2026M03	5.74	0.261	-0.121	5.646	5.836	5.527	5.947	5.294	6.156
2026M04	5.745	0.265	-0.121	5.65	5.842	5.53	5.955	5.293	6.166
2026M05	5.75	0.268	-0.12	5.653	5.848	5.532	5.962	5.292	6.176
2026M06	5.755	0.271	-0.118	5.657	5.854	5.535	5.97	5.292	6.187
2026M07	5.76	0.275	-0.116	5.661	5.86	5.537	5.977	5.291	6.198
2026M08	5.764	0.278	-0.111	5.665	5.866	5.539	5.985	5.291	6.209
2026M09	5.77	0.281	-0.108	5.668	5.872	5.542	5.992	5.291	6.219
2026M10	5.775	0.284	-0.103	5.672	5.878	5.544	6	5.291	6.23
2026M11	5.779	0.288	-0.103	5.676	5.884	5.546	6.007	5.29	6.24
2026M12	5.784	0.291	-0.101	5.679	5.89	5.548	6.015	5.29	6.251
2027M01	5.789	0.294	-0.102	5.683	5.896	5.551	6.022	5.289	6.261
2027M02	5.794	0.297	-0.099	5.687	5.902	5.553	6.03	5.289	6.271
2027M03	5.799	0.301	-0.097	5.691	5.908	5.555	6.038	5.289	6.282
2027M04	5.804	0.304	-0.092	5.695	5.914	5.557	6.045	5.289	6.292
2027M05	5.809	0.307	-0.091	5.699	5.92	5.559	6.053	5.288	6.303
2027M06	5.814	0.31	-0.091	5.702	5.926	5.562	6.06	5.288	6.313
2027M07	5.819	0.314	-0.092	5.706	5.932	5.564	6.068	5.287	6.323
2027M08	5.824	0.317	-0.089	5.71	5.938	5.567	6.075	5.287	6.333
2027M09	5.828	0.32	-0.089	5.713	5.944	5.569	6.083	5.286	6.344
2027M10	5.829	0.324	-0.074	5.717	5.951	5.572	6.091	5.285	6.355
2027M11	5.838	0.327	-0.086	5.721	5.957	5.574	6.098	5.285	6.365

Table 8
Cont'd

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2027M12	5.843	0.331	-0.084	5.725	5.963	5.576	6.106	5.284	6.376
2028M01	5.848	0.334	-0.081	5.728	5.969	5.579	6.113	5.283	6.387
2028M02	5.853	0.337	-0.077	5.732	5.975	5.581	6.121	5.283	6.398
2028M03	5.858	0.341	-0.074	5.736	5.981	5.584	6.129	5.283	6.409
2028M04	5.863	0.344	-0.075	5.74	5.987	5.586	6.136	5.282	6.419
2028M05	5.868	0.347	-0.075	5.743	5.994	5.588	6.144	5.281	6.43
2028M06	5.872	0.351	-0.072	5.747	6	5.59	6.151	5.281	6.44
2028M07	5.877	0.354	-0.071	5.751	6.006	5.593	6.159	5.281	6.451
2028M08	5.882	0.357	-0.066	5.755	6.012	5.595	6.167	5.282	6.461
2028M09	5.887	0.361	-0.061	5.759	6.018	5.598	6.175	5.282	6.473
2028M10	5.892	0.364	-0.058	5.762	6.024	5.6	6.182	5.282	6.484
2028M11	5.897	0.367	-0.054	5.766	6.03	5.602	6.19	5.282	6.495
2028M12	5.902	0.37	-0.054	5.77	6.036	5.605	6.198	5.281	6.505

Source: Author's estimation

Table 9
Result of Fan Chart of Foreign Direct Investment Growth (Monthly Data)

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2018M02	0.882	0.011	0.786	0.88	0.884	0.878	0.889	0.866	0.906
2018M03	0.876	0.023	0.148	0.873	0.88	0.869	0.888	0.837	0.919
2018M04	0.871	0.039	-0.142	0.865	0.878	0.858	0.89	0.8	0.94
2018M05	0.865	0.054	-0.162	0.857	0.876	0.847	0.893	0.766	0.962
2018M06	0.861	0.072	-0.196	0.849	0.875	0.834	0.898	0.728	0.987
2018M07	0.857	0.091	-0.224	0.841	0.875	0.821	0.904	0.688	1.015
2018M08	0.853	0.11	-0.247	0.833	0.875	0.808	0.91	0.646	1.044
2018M09	0.849	0.131	-0.297	0.825	0.876	0.793	0.919	0.601	1.073
2018M10	0.846	0.153	-0.329	0.817	0.878	0.777	0.928	0.556	1.102
2018M11	0.843	0.174	-0.354	0.809	0.881	0.761	0.938	0.511	1.133
2018M12	0.84	0.197	-0.391	0.801	0.884	0.744	0.948	0.463	1.164
2019M01	0.838	0.22	-0.398	0.793	0.887	0.727	0.959	0.417	1.197
2019M02	0.836	0.243	-0.418	0.786	0.891	0.709	0.971	0.368	1.23
2019M03	0.832	0.267	-0.426	0.778	0.895	0.691	0.984	0.318	1.264
2019M04	0.832	0.291	-0.421	0.77	0.899	0.673	0.997	0.271	1.301
2019M05	0.831	0.316	-0.418	0.762	0.903	0.654	1.009	0.222	1.338
2019M06	0.829	0.34	-0.402	0.754	0.909	0.636	1.023	0.178	1.375
2019M07	0.828	0.362	-0.39	0.746	0.914	0.618	1.036	0.135	1.411
2019M08	0.827	0.385	-0.373	0.738	0.919	0.599	1.05	0.095	1.446
2019M09	0.826	0.407	-0.346	0.73	0.925	0.582	1.063	0.056	1.484
2019M10	0.825	0.427	-0.323	0.723	0.93	0.564	1.076	0.021	1.518
2019M11	0.824	0.447	-0.308	0.716	0.935	0.547	1.09	-0.013	1.55
2019M12	0.824	0.465	-0.29	0.708	0.941	0.53	1.104	-0.043	1.58
2020M01	0.824	0.484	-0.28	0.701	0.947	0.514	1.117	-0.076	1.611
2020M02	0.824	0.502	-0.256	0.694	0.953	0.498	1.13	-0.104	1.643
2020M03	0.824	0.518	-0.244	0.687	0.959	0.481	1.143	-0.131	1.669
2020M04	0.824	0.535	-0.226	0.68	0.964	0.466	1.156	-0.157	1.699
2020M05	0.825	0.551	-0.203	0.674	0.97	0.451	1.169	-0.18	1.729
2020M06	0.825	0.566	-0.185	0.667	0.976	0.436	1.181	-0.201	1.754
2020M07	0.825	0.58	-0.177	0.66	0.981	0.421	1.193	-0.224	1.778
2020M08	0.825	0.595	-0.17	0.655	0.987	0.408	1.205	-0.248	1.803
2020M09	0.826	0.609	-0.152	0.649	0.992	0.395	1.217	-0.266	1.828
2020M10	0.825	0.621	-0.142	0.644	0.996	0.38	1.228	-0.285	1.849
2020M11	0.826	0.634	-0.137	0.639	1.002	0.367	1.239	-0.304	1.87
2020M12	0.826	0.644	-0.128	0.634	1.006	0.355	1.249	-0.319	1.887
2021M01	0.826	0.656	-0.13	0.63	1.012	0.343	1.26	-0.338	1.905
2021M02	0.829	0.666	-0.129	0.625	1.017	0.332	1.27	-0.354	1.922
2021M03	0.827	0.677	-0.127	0.621	1.022	0.323	1.281	-0.371	1.937
2021M04	0.828	0.686	-0.127	0.617	1.027	0.314	1.291	-0.386	1.953
2021M05	0.827	0.696	-0.117	0.613	1.031	0.305	1.301	-0.398	1.969
2021M06	0.829	0.704	-0.115	0.608	1.036	0.297	1.312	-0.409	1.983
2021M07	0.829	0.713	-0.111	0.606	1.04	0.289	1.322	-0.422	1.998
2021M08	0.829	0.721	-0.107	0.603	1.045	0.282	1.33	-0.433	2.012
2021M09	0.83	0.728	-0.101	0.6	1.05	0.275	1.337	-0.441	2.025
2021M10	0.83	0.735	-0.099	0.597	1.054	0.269	1.344	-0.453	2.038
2021M11	0.83	0.742	-0.103	0.596	1.058	0.264	1.352	-0.465	2.047
2021M12	0.83	0.748	-0.096	0.594	1.062	0.258	1.36	-0.471	2.06
2022M01	0.829	0.753	-0.091	0.591	1.066	0.253	1.366	-0.477	2.067
2022M02	0.832	0.758	-0.092	0.589	1.07	0.25	1.373	-0.482	2.076
2022M03	0.832	0.763	-0.096	0.587	1.073	0.248	1.379	-0.491	2.083
2022M04	0.833	0.767	-0.092	0.586	1.074	0.243	1.383	-0.498	2.092
2022M05	0.834	0.772	-0.096	0.585	1.078	0.24	1.389	-0.505	2.099
2022M06	0.833	0.776	-0.1	0.584	1.081	0.237	1.394	-0.512	2.103
2022M07	0.834	0.78	-0.104	0.585	1.084	0.235	1.4	-0.518	2.109
2022M08	0.835	0.784	-0.09	0.584	1.088	0.231	1.404	-0.518	2.12
2022M09	0.838	0.786	-0.096	0.583	1.09	0.228	1.409	-0.522	2.123
2022M10	0.837	0.79	-0.089	0.583	1.093	0.227	1.414	-0.525	2.132
2022M11	0.839	0.793	-0.094	0.583	1.096	0.226	1.418	-0.532	2.137
2022M12	0.839	0.796	-0.092	0.583	1.099	0.225	1.422	-0.534	2.144

Table 9
Cont'd

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2023M01	0.84	0.799	-0.09	0.582	1.101	0.223	1.424	-0.538	2.149
2023M02	0.838	0.799	-0.081	0.583	1.103	0.222	1.428	-0.534	2.152
2023M03	0.84	0.802	-0.078	0.583	1.105	0.221	1.43	-0.537	2.159
2023M04	0.84	0.806	-0.069	0.583	1.107	0.221	1.433	-0.54	2.17
2023M05	0.839	0.808	-0.067	0.584	1.108	0.219	1.435	-0.543	2.173
2023M06	0.842	0.809	-0.073	0.584	1.11	0.219	1.437	-0.545	2.176
2023M07	0.842	0.81	-0.071	0.584	1.11	0.219	1.441	-0.545	2.178
2023M08	0.844	0.812	-0.074	0.584	1.112	0.218	1.443	-0.548	2.181
2023M09	0.843	0.814	-0.07	0.584	1.113	0.219	1.446	-0.549	2.186
2023M10	0.846	0.815	-0.076	0.585	1.116	0.219	1.448	-0.552	2.188
2023M11	0.846	0.817	-0.077	0.586	1.118	0.22	1.449	-0.556	2.192
2023M12	0.848	0.818	-0.081	0.586	1.12	0.221	1.45	-0.558	2.194
2024M01	0.847	0.819	-0.08	0.586	1.123	0.22	1.452	-0.557	2.195
2024M02	0.849	0.82	-0.079	0.587	1.124	0.221	1.455	-0.558	2.199
2024M03	0.85	0.821	-0.074	0.589	1.124	0.222	1.458	-0.557	2.205
2024M04	0.852	0.824	-0.078	0.589	1.126	0.22	1.46	-0.561	2.208
2024M05	0.852	0.824	-0.077	0.59	1.127	0.22	1.46	-0.562	2.21
2024M06	0.854	0.825	-0.082	0.591	1.129	0.22	1.461	-0.564	2.211
2024M07	0.854	0.825	-0.084	0.592	1.129	0.221	1.463	-0.563	2.21
2024M08	0.857	0.826	-0.084	0.593	1.13	0.223	1.466	-0.563	2.215
2024M09	0.858	0.826	-0.088	0.593	1.131	0.222	1.468	-0.564	2.213
2024M10	0.858	0.833	-0.054	0.594	1.131	0.221	1.468	-0.565	2.241
2024M11	0.859	0.828	-0.084	0.594	1.132	0.223	1.469	-0.564	2.219
2024M12	0.86	0.828	-0.089	0.593	1.134	0.224	1.471	-0.565	2.217
2025M01	0.861	0.884	0.21	0.593	1.135	0.224	1.472	-0.565	2.445
2025M02	0.849	0.927	0.427	0.593	1.136	0.224	1.475	-0.566	2.611
2025M03	0.861	1.006	0.74	0.594	1.137	0.224	1.477	-0.566	2.9
2025M04	0.861	1.003	0.726	0.595	1.137	0.226	1.478	-0.566	2.889
2025M05	0.86	1.009	0.75	0.595	1.137	0.226	1.479	-0.567	2.911
2025M06	0.861	1.026	0.801	0.595	1.138	0.226	1.481	-0.57	2.967
2025M07	0.861	1.014	0.763	0.595	1.137	0.225	1.481	-0.569	2.928
2025M08	0.858	1.026	0.806	0.595	1.138	0.224	1.482	-0.568	2.967
2025M09	0.861	1.016	0.77	0.596	1.138	0.225	1.484	-0.568	2.935
2025M10	0.862	1.005	0.716	0.595	1.139	0.224	1.487	-0.571	2.891
2025M11	0.863	0.998	0.69	0.596	1.139	0.225	1.488	-0.57	2.867
2025M12	0.863	0.981	0.618	0.596	1.14	0.226	1.49	-0.571	2.803
2026M01	0.863	0.971	0.579	0.596	1.141	0.227	1.489	-0.57	2.767
2026M02	0.864	0.965	0.555	0.596	1.142	0.227	1.491	-0.569	2.747
2026M03	0.864	0.949	0.484	0.596	1.144	0.227	1.491	-0.569	2.686
2026M04	0.865	0.902	0.265	0.596	1.144	0.227	1.492	-0.568	2.505
2026M05	0.865	0.847	-0.025	0.597	1.144	0.226	1.492	-0.569	2.283
2026M06	0.864	0.841	-0.054	0.596	1.144	0.226	1.492	-0.569	2.259
2026M07	0.865	0.839	-0.068	0.596	1.144	0.227	1.493	-0.569	2.25
2026M08	0.867	0.842	-0.05	0.595	1.144	0.229	1.496	-0.568	2.264
2026M09	0.867	0.839	-0.065	0.595	1.145	0.231	1.496	-0.568	2.254
2026M10	0.869	0.84	-0.064	0.593	1.144	0.231	1.496	-0.568	2.255
2026M11	0.869	0.843	-0.052	0.593	1.144	0.232	1.496	-0.569	2.266
2026M12	0.869	0.843	-0.053	0.593	1.144	0.232	1.498	-0.57	2.266
2027M01	0.86	0.844	-0.041	0.592	1.143	0.233	1.499	-0.572	2.269
2027M02	0.869	0.849	-0.017	0.592	1.143	0.234	1.499	-0.569	2.292
2027M03	0.867	0.847	-0.031	0.591	1.143	0.235	1.499	-0.571	2.282
2027M04	0.866	0.845	-0.044	0.592	1.142	0.235	1.497	-0.572	2.272
2027M05	0.868	0.847	-0.042	0.593	1.142	0.235	1.499	-0.575	2.279
2027M06	0.865	0.848	-0.035	0.593	1.142	0.235	1.499	-0.577	2.282
2027M07	0.867	0.846	-0.051	0.594	1.141	0.236	1.499	-0.578	2.274
2027M08	0.868	0.845	-0.061	0.592	1.141	0.234	1.498	-0.578	2.266
2027M09	0.868	0.845	-0.065	0.591	1.14	0.234	1.499	-0.58	2.264
2027M10	0.863	0.845	-0.057	0.591	1.141	0.234	1.499	-0.579	2.265
2027M11	0.866	0.846	-0.061	0.59	1.141	0.235	1.5	-0.58	2.267

Table 9
Cont'd

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2027M12	0.868	0.846	-0.059	0.59	1.14	0.235	1.5	-0.58	2.27
2028M01	0.867	0.846	-0.06	0.589	1.139	0.234	1.5	-0.581	2.268
2028M02	0.867	0.846	-0.067	0.589	1.139	0.233	1.501	-0.582	2.264
2028M03	0.868	0.846	-0.062	0.588	1.14	0.232	1.501	-0.581	2.266
2028M04	0.868	0.847	-0.058	0.588	1.14	0.231	1.499	-0.581	2.27
2028M05	0.861	0.847	-0.047	0.588	1.14	0.231	1.5	-0.58	2.27
2028M06	0.869	0.847	-0.052	0.589	1.141	0.23	1.5	-0.578	2.271
2028M07	0.868	0.847	-0.046	0.587	1.14	0.229	1.5	-0.576	2.273
2028M08	0.868	0.848	-0.049	0.587	1.14	0.23	1.499	-0.58	2.274
2028M09	0.868	0.848	-0.042	0.588	1.14	0.228	1.498	-0.577	2.276
2028M10	0.866	0.847	-0.037	0.588	1.14	0.228	1.498	-0.575	2.277
2028M11	0.866	0.848	-0.033	0.587	1.139	0.228	1.498	-0.575	2.279
2028M12	0.864	0.847	-0.034	0.587	1.139	0.228	1.498	-0.576	2.276

Source: Author's estimation

Table 10
Result of Fan Chart of Worker's Remittances Growth (Monthly Data)

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2018M02	6.736	0.035	0.158	6.728	6.744	6.718	6.756	6.676	6.801
2018M03	6.747	0.207	-2.449	6.733	6.762	6.715	6.783	6.201	6.885
2018M04	6.756	0.26	-2.227	6.733	6.778	6.705	6.811	6.089	6.973
2018M05	6.762	0.315	-2.015	6.73	6.793	6.689	6.839	5.976	7.066
2018M06	6.765	0.366	-1.809	6.723	6.807	6.667	6.867	5.876	7.159
2018M07	6.766	0.435	-1.687	6.712	6.819	6.639	6.897	5.728	7.259
2018M08	6.765	0.488	-1.498	6.698	6.83	6.607	6.928	5.63	7.36
2018M09	6.763	0.572	-1.483	6.682	6.84	6.57	6.959	5.435	7.46
2018M10	6.757	0.62	-1.338	6.662	6.849	6.529	6.989	5.349	7.55
2018M11	6.75	0.614	-0.903	6.641	6.857	6.484	7.02	5.447	7.641
2018M12	6.742	0.588	-0.239	6.617	6.864	6.438	7.05	5.641	7.736
2019M01	6.733	0.641	-0.213	6.592	6.87	6.388	7.08	5.54	7.82
2019M02	6.722	0.697	-0.194	6.565	6.875	6.337	7.111	5.435	7.904
2019M03	6.723	0.753	-0.206	6.536	6.879	6.283	7.14	5.323	7.985
2019M04	6.703	0.81	-0.196	6.504	6.883	6.227	7.17	5.21	8.062
2019M05	6.686	0.864	-0.176	6.474	6.888	6.17	7.197	5.106	8.14
2019M06	6.671	0.915	-0.153	6.442	6.89	6.114	7.224	5.01	8.216
2019M07	6.655	0.966	-0.136	6.409	6.892	6.058	7.248	4.911	8.289
2019M08	6.64	1.017	-0.118	6.374	6.895	5.998	7.274	4.816	8.36
2019M09	6.624	1.068	-0.091	6.339	6.895	5.937	7.297	4.723	8.438
2019M10	6.612	1.115	-0.074	6.305	6.896	5.88	7.322	4.636	8.507
2019M11	6.591	1.163	-0.053	6.269	6.895	5.82	7.341	4.546	8.574
2019M12	6.573	1.21	-0.031	6.234	6.893	5.76	7.362	4.461	8.643
2020M01	6.557	1.255	-0.011	6.197	6.892	5.701	7.382	4.379	8.708
2020M02	6.548	1.298	-0.013	6.162	6.888	5.647	7.401	4.293	8.762
2020M03	6.521	1.34	-0.003	6.128	6.886	5.591	7.417	4.207	8.815
2020M04	6.505	1.379	0.008	6.09	6.885	5.536	7.432	4.133	8.865
2020M05	6.487	1.418	0.023	6.054	6.884	5.479	7.45	4.061	8.918
2020M06	6.47	1.457	0.033	6.019	6.88	5.426	7.465	3.989	8.968
2020M07	6.454	1.491	0.038	5.985	6.876	5.374	7.477	3.918	9.009
2020M08	6.434	1.527	0.049	5.951	6.871	5.322	7.488	3.849	9.056
2020M09	6.415	1.561	0.057	5.919	6.867	5.269	7.5	3.784	9.096
2020M10	6.395	1.592	0.066	5.886	6.858	5.222	7.51	3.721	9.133
2020M11	6.377	1.625	0.082	5.855	6.854	5.177	7.522	3.662	9.181
2020M12	6.359	1.656	0.084	5.824	6.851	5.131	7.53	3.597	9.215
2021M01	6.338	1.685	0.092	5.793	6.845	5.082	7.541	3.539	9.248
2021M02	6.32	1.717	0.097	5.762	6.839	5.039	7.552	3.476	9.287
2021M03	6.301	1.743	0.105	5.731	6.835	4.999	7.559	3.423	9.319
2021M04	6.28	1.769	0.101	5.704	6.827	4.954	7.569	3.363	9.337
2021M05	6.262	1.796	0.099	5.674	6.821	4.913	7.574	3.302	9.363
2021M06	6.217	1.821	0.115	5.645	6.816	4.875	7.582	3.246	9.387
2021M07	6.225	1.844	0.098	5.617	6.811	4.835	7.588	3.193	9.405
2021M08	6.208	1.867	0.104	5.587	6.803	4.798	7.592	3.146	9.429
2021M09	6.196	1.889	0.105	5.563	6.797	4.761	7.598	3.1	9.452
2021M10	6.176	1.911	0.11	5.539	6.791	4.725	7.602	3.054	9.475
2021M11	6.166	1.932	0.113	5.513	6.782	4.689	7.606	3.01	9.497
2021M12	6.148	1.952	0.123	5.489	6.776	4.656	7.609	2.972	9.524
2022M01	6.104	1.972	0.146	5.465	6.768	4.623	7.614	2.934	9.549
2022M02	6.118	1.991	0.136	5.44	6.756	4.594	7.619	2.892	9.569
2022M03	6.127	2.01	0.121	5.419	6.749	4.563	7.623	2.846	9.583
2022M04	6.09	2.026	0.131	5.399	6.743	4.536	7.627	2.807	9.596
2022M05	6.073	2.043	0.133	5.378	6.736	4.506	7.629	2.769	9.608
2022M06	6.061	2.059	0.134	5.357	6.728	4.481	7.631	2.732	9.624
2022M07	6.047	2.072	0.137	5.338	6.718	4.453	7.632	2.702	9.634
2022M08	6.033	2.09	0.143	5.32	6.71	4.427	7.637	2.667	9.657
2022M09	6.019	2.104	0.143	5.298	6.699	4.402	7.641	2.633	9.665
2022M10	6.006	2.116	0.145	5.282	6.689	4.377	7.642	2.603	9.675
2022M11	5.992	2.13	0.142	5.263	6.68	4.356	7.643	2.565	9.681
2022M12	5.979	2.145	0.144	5.242	6.672	4.332	7.642	2.53	9.696

Table 10
Cont'd

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2023M01	5.97	2.157	0.142	5.225	6.666	4.305	7.643	2.5	9.701
2023M02	5.959	2.171	0.143	5.209	6.66	4.284	7.643	2.468	9.717
2023M03	5.942	2.185	0.143	5.192	6.653	4.268	7.645	2.431	9.727
2023M04	5.934	2.199	0.153	5.175	6.647	4.245	7.647	2.411	9.751
2023M05	5.922	2.211	0.15	5.16	6.641	4.226	7.646	2.377	9.758
2023M06	5.911	2.22	0.15	5.148	6.635	4.21	7.645	2.353	9.764
2023M07	5.901	2.232	0.155	5.132	6.63	4.194	7.646	2.329	9.78
2023M08	5.888	2.244	0.16	5.117	6.625	4.176	7.642	2.304	9.794
2023M09	5.879	2.253	0.166	5.101	6.616	4.16	7.643	2.285	9.806
2023M10	5.871	2.264	0.172	5.085	6.609	4.144	7.641	2.263	9.821
2023M11	5.86	2.272	0.174	5.07	6.601	4.127	7.64	2.243	9.826
2023M12	5.852	2.283	0.177	5.059	6.593	4.115	7.644	2.221	9.841
2024M01	5.841	2.291	0.172	5.047	6.589	4.101	7.644	2.194	9.84
2024M02	5.83	2.298	0.172	5.035	6.582	4.089	7.642	2.174	9.843
2024M03	5.823	2.308	0.174	5.024	6.576	4.08	7.642	2.149	9.856
2024M04	5.809	2.319	0.178	5.012	6.57	4.068	7.643	2.125	9.869
2024M05	5.805	2.328	0.176	4.998	6.562	4.053	7.642	2.102	9.876
2024M06	5.797	2.339	0.179	4.991	6.56	4.043	7.644	2.079	9.893
2024M07	5.791	2.347	0.183	4.981	6.556	4.033	7.646	2.065	9.906
2024M08	5.78	2.354	0.186	4.972	6.549	4.019	7.644	2.049	9.91
2024M09	5.774	2.361	0.188	4.963	6.542	4.006	7.643	2.031	9.919
2024M10	5.765	2.369	0.194	4.953	6.536	3.995	7.639	2.017	9.931
2024M11	5.759	2.374	0.198	4.943	6.529	3.983	7.643	2.007	9.937
2024M12	5.754	2.377	0.196	4.937	6.524	3.97	7.637	1.995	9.934
2025M01	5.751	2.384	0.198	4.929	6.515	3.962	7.634	1.981	9.943
2025M02	5.742	2.391	0.2	4.922	6.514	3.952	7.637	1.964	9.952
2025M03	5.748	2.396	0.196	4.912	6.514	3.945	7.635	1.954	9.957
2025M04	5.73	2.403	0.209	4.901	6.509	3.932	7.634	1.944	9.97
2025M05	5.723	2.411	0.211	4.892	6.504	3.918	7.63	1.928	9.979
2025M06	5.717	2.415	0.21	4.887	6.502	3.912	7.629	1.914	9.981
2025M07	5.713	2.42	0.216	4.878	6.499	3.908	7.629	1.908	9.991
2025M08	5.708	2.426	0.22	4.873	6.496	3.901	7.628	1.897	10.003
2025M09	5.701	2.429	0.218	4.868	6.496	3.895	7.628	1.886	10.001
2025M10	5.706	2.436	0.218	4.863	6.49	3.888	7.624	1.872	10.015
2025M11	5.691	2.44	0.225	4.857	6.488	3.882	7.621	1.864	10.022
2025M12	5.686	2.444	0.223	4.852	6.488	3.874	7.618	1.851	10.022
2026M01	5.681	2.45	0.224	4.846	6.481	3.865	7.615	1.836	10.028
2026M02	5.676	2.455	0.222	4.841	6.478	3.857	7.619	1.824	10.029
2026M03	5.67	2.459	0.222	4.833	6.475	3.854	7.617	1.809	10.034
2026M04	5.658	2.467	0.227	4.827	6.473	3.848	7.617	1.795	10.046
2026M05	5.662	2.472	0.224	4.825	6.472	3.841	7.617	1.784	10.052
2026M06	5.653	2.475	0.225	4.821	6.469	3.837	7.617	1.775	10.053
2026M07	5.654	2.478	0.225	4.817	6.467	3.83	7.618	1.769	10.057
2026M08	5.638	2.482	0.234	4.814	6.464	3.827	7.617	1.763	10.066
2026M09	5.638	2.485	0.236	4.809	6.457	3.819	7.616	1.758	10.07
2026M10	5.636	2.486	0.232	4.802	6.455	3.815	7.617	1.751	10.064
2026M11	5.635	2.489	0.228	4.799	6.452	3.809	7.616	1.739	10.063
2026M12	5.632	2.494	0.232	4.796	6.452	3.805	7.617	1.732	10.076
2027M01	5.627	2.501	0.233	4.789	6.45	3.798	7.618	1.717	10.086
2027M02	5.624	2.505	0.235	4.784	6.451	3.789	7.617	1.712	10.091
2027M03	5.622	2.509	0.237	4.784	6.449	3.783	7.615	1.705	10.099
2027M04	5.616	2.515	0.238	4.778	6.447	3.776	7.616	1.692	10.105
2027M05	5.616	2.515	0.232	4.774	6.443	3.77	7.615	1.683	10.097
2027M06	5.61	2.522	0.237	4.767	6.44	3.766	7.616	1.671	10.11
2027M07	5.615	2.525	0.233	4.765	6.438	3.76	7.61	1.662	10.112
2027M08	5.597	2.529	0.243	4.76	6.437	3.756	7.611	1.659	10.122
2027M09	5.61	2.536	0.245	4.756	6.435	3.753	7.613	1.652	10.141
2027M10	5.6	2.62	0.38	4.753	6.434	3.748	7.608	1.643	10.464
2027M11	5.597	2.65	0.42	4.747	6.43	3.745	7.605	1.631	10.568

Table 10
Cont'd

Year	Growth Rate	St. Dev	Skewness	Confidence Interval					
				30 percent		60 percent		90 percent	
				Lower	Upper	Lower	Upper	Lower	Upper
2027M12	5.592	2.606	0.348	4.743	6.427	3.74	7.606	1.626	10.389
2028M01	5.584	2.72	0.523	4.738	6.426	3.741	7.606	1.62	10.822
2028M02	5.585	2.821	0.662	4.734	6.424	3.735	7.601	1.615	11.192
2028M03	5.581	2.86	0.709	4.733	6.421	3.73	7.602	1.607	11.325
2028M04	5.603	2.874	0.716	4.731	6.422	3.726	7.603	1.602	11.372
2028M05	5.534	2.953	0.829	4.73	6.422	3.721	7.603	1.594	11.641
2028M06	5.603	2.963	0.82	4.722	6.42	3.72	7.598	1.587	11.679
2028M07	5.567	3.01	0.878	4.719	6.419	3.717	7.597	1.575	11.831
2028M08	5.565	3.024	0.887	4.715	6.418	3.715	7.596	1.563	11.872
2028M09	5.563	3.042	0.908	4.716	6.416	3.711	7.596	1.563	11.934
2028M10	5.561	3.061	0.927	4.711	6.411	3.702	7.598	1.557	11.993
2028M11	5.561	3.099	0.967	4.709	6.411	3.695	7.593	1.554	12.122
2028M12	5.551	3.107	0.976	4.707	6.41	3.689	7.592	1.551	12.144

Source: Author's estimation

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