



Investigating the Real Shocks in the Discount Rate of Pakistan

Muhammad Yasir^{1*}

ABSTRACT

The monetary-policy always has a vital role in determination of the economic conditions of any country, It is witnessed that the discount rate announced in year 1948 was of 3%, while the discount rate announced in year 2013 has come to be at 10%. The research aims to investigate Real Shocks in the Discount Rate of Pakistan, where by 66 years of historical data of the discount rate in Pakistan is tested using the Augmented Ducky Fuller test in-order to determine the stationarity. The outcomes of the results of this study demonstrate that the discount rate of Pakistan is non-stationary in nature which confirms that there is a real shock in the discount rate of Pakistan for 1948-2013.

Keywords: Real shocks, discount rate.

Introduction

Overview

Since monetary policy plays an integral part in determination of the economic state of a country, similar is the case with Pakistan (the country in focus). In the monetary policy, discount rate is announced for that year and is implemented from the first of July until the 30th June of the next year. This discount rate is used for discounting of the future cash flows into their present values, following the phenomenon of the time-value of money. Similarly, if the discount rate is increased, it can sway people towards saving more in the banks, and vice versa. Thus money-supply is also affected by changes in the discount rate.

The study, therefore, aims to note the various shocks in the discount rate (if any) in order to aid the policy-makers reach better conclusions and future forecasts. All the recorded historical data of the discount rate in Pakistan has been taken into account for this research, which is then tested using the statistical techniques to determine the occurrence of shocks in the discount rate of Pakistan.

Author's Affiliation:

Institution(s) Name: ¹Iqra University

Country: ¹Pakistan

Corresponding Author's Email: ¹yasir.net123@gmail.com

*The material presented by the author does not necessarily portray the view point of the editors/ editorial board and the management of ORIC, Iqra University, Main Campus, Karachi-PAKISTAN.

With the help of empirical evidence, the research leads to the conclusion that the discount rate of Pakistan is non-stationary (which frequent shocks occurring through the timeline). These minute fluctuations in the discount rate can very well translate to big changes in the economy; whereby the financial institutions (esp. banks) being unable to accurately estimate the time value of money over longer terms, clearly fall victims to these fluctuations. The State Bank of Pakistan announces discount rate based on monetary requirements of the economy. , After a year had passed since Pakistan's establishment (1948) till the year of 1971, the discount-rate only twice reached at 5% from the initially set rate of 3%.

However in the year 1993-1994, a huge percentage change in the discount-rate is witnessed; whereby the discount rate in the year 1993 was 10%, increasing up to 15% in the subsequent year of 1994, which is a 50% change in the discount rate, while a similar spike is observed in the years 2007 to 2008.

Moreover, the years 2000-2001-2002, also presented huge percentage changes in the discount rate. In the year 2000, discount rate was 13%, which went down to 10% subsequently in the year 2001, recording a percentage change of -23%.

Since this thesis is limited to just the fluctuations in the discount-rate of Pakistan, still however there is much that needs to be studied about the discount rate, especially as to how the fluctuations can be minimized or avoided. Therefore, additional research will help shift the policy focus towards making the discount rate as stable as possible. Furthermore, future researchers can also look into how the discount-rate affects the worth of the Pakistani Rupee in the international money market.

Problem Statement

To investigate real shocks in the discount rate of Pakistan.

Background, Objectives and Significance of the Study

The objective of this article is to interrogate the fluctuations in the discount rate of Pakistan, as these fluctuations affect and determine the economic conditions of the country.

Outline of the Study

The study notes that initially the discount-rate of Pakistan remained at the firstly set rate of 3% (in 1948) for subsequent 11 years, till 1958. Similarly, from the year 1959 till the year 1964, the rate remained at 4% per annum, tenure of about 6 years. Then-after, 7 years of tenure is recorded where the discount-rate did not change, and remained at 5% per annum as from 1965 till the year 1971. From the year 1974 till the year 1976, discount-rate stayed flat at 9% per annum. Moreover, for a long tenure about 17 years the discount-rate remained at about 10% per annum, starting 1977 till 1993.

Furthermore, a decreasing trend is noted from the year 1996 till 2002, where the discount rate decreased from 20% per annum to 7.5% per annum. Moreover, an increasing trend is observed from the year 2004 till 2008, where the discount rate increased from the 7.5% per annum to 15% per annum.

In addition, a huge variation is noted from the year 1994 till 2013, whereby the discount rate follows all sorts the trends; firstly increases, then decreases, and later for a couple of years stayed flat.

Operational Definitions used in this research

Discount Rate

Interest rate yearly announced by the State Bank of Pakistan (SBP) in its monetary

policy and which makes up the determining factor of the time value of money.

Shocks

Visible fluctuations in the discount rate.

Literature Review

For several economies it was observed that variations in the discount-rate lead to variations in inflation, whereby an increased inflation can lead to increased production levels in the short-run. However, if the discount rate remains constant for many years then business forecasts would naturally be more accurate and with controlled inflation as a result.

Cochran variance test Cochran (1941) and Campbell-Mankiw breakdown test Campbell and Mankiw (1990), are used to find out if the many net-discount ratios lead to a trend of stationarity or not. Gamber and Sorensen (1994) noticed that any shifts in the mean in discount rates due to any economical player are the cause of stationarity as confirmed by different unit root tests. Haslag, Nieswiadomy and Slottje (1991) observed that when data is enhanced through the time tenure, the net discount ratio is likely to be repeating the previous trends. Therefore, it can overall be predicted that the series of discount ratios is persistence with some temporarily fluctuations.

Unpredicted interest rate is that which the lenders and the borrowers estimate for future business, which was later proven to be ineffective. In addition, inflation risk can be mistaken as if the future earnings are being earned, if the increasing trend is not considered. Inflation rate, growth rate of earnings, and rate of interest go side by side; in the US economy, the year 1970 was known as the year with highest reaching values of all three. As per the cumulative experience, it has been observed that the yield on long-term treasury-bonds and the earnings ratio move in the same manner but the yield ratio on long-term treasury bills is proven to be more appropriate for calculating the present value of future earnings. On the other hand, critics confirmed that this is not a good approach as yield on the long-term treasury securities is affected by fluctuations in the inflation rate(Harris, 1983).It is found that the real earnings growth ratio and the real rates of interest are inversely related to the inflation rate; thus in the short term, the discount rate is more reliable or suitable to forecast present values of the future cash flows and any shock which include permanent and temporary both then affect the all these stated variables accordingly. (Harris, 1983).

Hancock and Richardson (1985) found Gini coefficient can be minimized if discount rates are kept 10-percent in an economy.

Fluctuations in the US discount rate do not have much impact on the foreign exchange market of the dollar, simply due to the unpredictable behavior of the discount rate by its historical values, as confirmed by (Brown, 1981).Brown (1981) further confirmed that Fed fund rate are not changed due to changes in the discount rate, while changes in the market policies compelled the discount rates to change and show shocks.

The discount rate of any country is the backbone of its monetary-policy, and leads to long lasting impact in many ways; including but not limited to societal status of the people in each class. Schwab (1979) investigated market risk through changes and fluctuations in the discount rate and its resulting impact on cash flows.

Hypothesis

H₁: There is a non-stationarity (shocks) in the discount rate of Pakistan.

Description of data and econometrical model

The time series data of discount rate for 65 years from 1948 to 2013 was collected from the State Bank of Pakistan. Since the data was time-series, thereby in-order to investigate about the presence of shocks in the selected series as stated above, Augmented Dickey Fuller unit root test (ADF) was deployed to determine the presence of stationarity/ non-stationarity in the given series of discount rates.

Findings and results

Table 1: Unit Root Test (At Level)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic (ADF)	-2.359799	0.1572
Test critical values: 1% level	-3.538362	
5% level	-2.908420	
10% level	-2.591799	

*MacKinnon (1996) one-sided p-values.

Findings of this paper as shown in table 1 confirms that trace statistics (t-stats= -2.359) is found more than the mackinnon critical values (-3.538362, -2.908420 and -2.591799) at 1%, 5% and 10% respectively thus we found the presence of non-stationarity at all 1%, 5% and 10% levels and hence we are failed to reject our hypothesis i.e. There is a non-stationarity (shocks) in the discount rate of Pakistan.

Discussions & Conclusion

Considering the history of changes in the discount rate of Pakistan, the study notes that initially the discount-rate of Pakistan remained at the firstly set rate of 3% (in 1948) for subsequent 11 years, till 1958. However in the year 1959 the discount-rate was raised to 4% per annum, an increase of 33%; this tenure lasted till the year 1964, about 6 years in total. Similarly, the discount rate was raised to 5% p.a. in the fiscal year of 1964-1965, making up a 25% increase in the discount rate. This discount rate is recorded to have kept intact for 7 years of tenure, as from 1965 till 1971. Furthermore, in the year 1972, the discount rate was announced to be 6% p.a., which is a 20% increase from the previously set 5% p.a. Similarly just after one year, i.e. in year 1973, the discount rate of Pakistan was announced at the rate of 8%, thus rising from 6% p.a. to 8% p.a. within the fiscal year 1972 to 1973, translates to a 33% increase in discount rate.

Furthermore, just after one year, i.e. in year 1974, the discount rate of Pakistan was announced to be 9% p.a., rising from 8% p.a. to 9% p.a. within the fiscal year of 1973 to 1974; which translates to a 13% increase in the discount rate. Although, this 9% discount rate stayed in place for 3 years, i.e. from 1974 till 1976, the upcoming year of 1977 witnessed a discount rate of 10%. Accounting for an 11% raise in the rate within the fiscal year of 1974-1976, this 10% discount rate of Pakistan stayed the same for 17 years to come, i.e. from 1977 till 1993. As after the varying trends within the discount rate from 1958 till 1993, no discount-rate remained in place for more than 1 year, except the ones announced in 2003-2004 and 1999-2000. Moreover, reductions in the discount-rate are also witnessed; for whereby, a decreasing trend is noted from the year 1996 till 2002, where the discount rate decreased from 20% per annum to 7.5% per annum. The percentage-changes in discount-rate for the

ranging fiscal years were recorded with fluctuating trends i.e. -10% in 1996-1997; -8% in 1997-1998; -21% in 1998-1999; -23% in 2000-2001; -25% in 2001-2002; -17% in 2008-2009; -14% in 2010-2011; and -12% in 2011-2012. Thus, the stated literature also confirmed the finding of this paper that there is a constant trend of non-stationarity/ shocks in the historical data of discount rate of Pakistan.

References

- Anderson, C. L., Dietz, M., Gordon, A., & Klawitter, M. (2004). Discount Rates in Vietnam. *The University of Chicago*, 52, 873-887.
- Brown, K. H. (1981). Effects of Changes in the Discount Rate on the Foreign Exchange Value of the Dollar: 1973 to 1978. *The Quarterly Journal of Economics*, 96, 551-558.
- Campbell, J. Y., & Mankiw, N. G. (1990). Permanent income, current income, and consumption. *Journal of Business & Economic Statistics*, 8(3), 265-279.
- Choi, W. G. (1999). Estimating the Discount Rate Policy Reaction Function of the Monetary Authority. *Journal of Applied Econometrics*, 14, 379-401.
- Cochran, W. G. (1941). The distribution of the largest of a set of estimated variances as a fraction of their total. *Annals of Eugenics*, 11(1), 47-52.
- Hancock, K., & Richardson, S. (1985). Discount Rates and the Distribution of Lifetime Earnings. *The Journal of Human Resources*, 20, 346-360.
- Harris, W. G. (1983). Inflation Risk as Determinant of the Discount Rate in Tort Settlements. *The Journal of Risk and Insurance*, 50, 265-280.
- Haslag, J. H., Nieswiadomy, M., & Slottje, D. J. (1991). Are Net Discount Ratios Stationary?: The Implications for Present Value Calculations. *American Risk and Insurance Association*, 58, 505-512.
- Hays, P., Schreiber, M., Payne, J. E., Ewing, B. T., & Piette, M. (2000). Are Net Discount Ratios Stationary? Evidence of Mean-Reversion and Persistence. *The Journal of Risk and Insurance*, 67, 439-449.
- Jones, D. D. (1985). Inflation Rates Implicit in Discounting Personal Injury Economic Losses. *The Journal of Risk and Insurance*, 52, 144-150.
- Laumas, G. S. (1981). Discount Rate and Wealth. *Journal of Political Economy*, 89, 196-198.
- Reinschmidt, K. F. (2002). Aggregate Social Discount Rate Derived from Individual Discount Rates. *Management Science*, 48, 307-312.
- Schauten, M., Stegink, R., & Graaff, G. d. (2010). The discount rate for discounted cash flow valuations of Intangible Assets. *Managerial Finance*, 36, 799-811.
- Schwab, J. E. (1979). On the Proper Adjustment for Risk through Discount Rates in a Mean-Variance Framework. 8, 61-65.
- Seiler, M. J. (1998). Do Changes in the Discount Rate and Fed Funds Rate Affect Financial Market Returns? *Managerial Finance*, 24.
- Thornton, D. L. (1994). Why Do T-Bill Rates React to Discount Rate Changes? *Journal of Money, Credit and Banking*, 26, 839-850.
- Vernon, J. (1985). *Discounting After-Tax Earnings with After-Tax Yields in Torts Settlements* (Vol. 52). American Risk and Insurance Association.