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Dr. Kumar Bijoy
Assistant Professor
Shaheed Sukhdev College of Business Studies
University of Delhi
(M.A., CFA, Ph.D)
kumarbijoy@sscbsdu.ac.in

The Case for the Implementation of an Indexed Unit of Account in India

Siddharth Garg

Student, Class 12, Modern School,
Barakhamba Road, New Delhi

Abstract—*An indexed unit of account is a unit of measurement whose value is linked to an indexsuch that its value moves in alignment with the movement of the index. Hence, if linked to the CPI, the value of the indexed unit of account would move in accordance with the general price level in a country. This paper examines the need for an indexed unit of account in India, particularly among the housing credit market. It analyses the difference in mortgage payments if home loans were defined in terms of an indexed unit of account instead of in the local currency to determine whether doing so leads to a fairer pricing of mortgages for both lenders and borrowers. It further analyses the feasibility of implementing such a system in India, the benefits that will accrue by doing so and proposes a few policy measures to ensure a successful implementation.*

Introduction

An indexed unit of account is a unit of measurement, used to quote prices, whose value is tied to an index, such that the value of the unit moves in alignment with the value of the index. It is a unit of value defined by a formula in terms of an index. The formula specifies how much money the unit is worth at each time (Shiller, Indexed Units of Account for the United States, 1997). It is often linked to indices such as the Consumer Price Index (CPI), so its real value[1] remains unaffected with a change in inflation.

In periods of higher inflation (when inflation is higher than the discounting rate), there is a redistribution effect: the debtors are benefitted while the creditors are left worse off (Choi, Kwon, & Lee, 2015). This inflationary risk is especially prevalent in longer-term contracts as the purchasing power of money keeps getting eroded over time due to inflation and its real value declines. To offer as protection against this inflationary risk, Indexed Units of Account are an important policy tool as their value is indexed to the Consumer Price Index. Hence, Indexed Units of Account help maintain the real value of money.

The primitive analogy of an Indexed Unit of Account is evidenced in the form of a "Tabular Standard of Value" proposed by William Stanley Jevons. Referring to previous works by Joseph Lowe and G. Poulett Scrope, Jevons presents the concept of a legal tender whose value is defined in terms of quantities of a variety of commodities. For example, a 100-unit note of such a legal tender would give to the owner the right to demand at any point of time twenty pounds of sugar, five pounds of tea, thirty pounds of wheat, among other items. Even over long periods of time this legal tender will remain constant in purchasing power (Jevons, 1875)

Variants of Indexed Units of Account

Various analogues of an indexed unit of account have been adopted in several countries. However, most of them were adopted by the government of a country only after their economy had started feeling the effects of high inflation. Countries such as Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico and Uruguay have, at some point of time, implemented an indexed unit of account for their economies.

The strongest evidence of Indexed Units of Account comes from Chile, where the government introduced an indexed unit of account named "Unidad de Fomento" (UF) in 1967, a time when prices were rising at about 27% per year. However, the UF wasn't popular in the initial stages of its implementation. In 1982, there was a major economic crisis in Chile, the worst since the Great Depression(Chilean National Library, n.d.). That is when the government started to publish the value of the UF on a daily basis in the newspapers, and the UF became more widely used(Levin, 1995). By 1983, over 60 percent of bank loans in Chile were written in the UF (Herrera & Valdés, 2005). It has become the preferred and predominant measure to determine the cost of Real Estate, values of housing and any secured loan, either of private entities or of the Chilean government.

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[1]Letting r denote the real interest rate, i denote the nominal interest rate, and π denote the inflation rate, the Fisher equation is:
$(1+i)=(1+r)(1+\pi)$
$1+i=1+r+\pi+r\pi$
$r=i-\pi-r\pi$
$r\approx i-\pi$

In Mexico, due to an economic crisis set off by the devaluation of the peso against the dollar, inflation rates reached as high as 51% in the 1990s. To counteract these effects, Mexico introduced a unit of accountby the name of "Unidad de Inversion" (UDI). The UDIs value was linked to the price level in the economy. It is used in credit instruments and trade contracts. The value of the UDI is calculated and published daily by the central bank of Mexico. In the last quarter of 1999, the Government also began offering 10-year securities denominated in UDI and 30-year UDI-indexed bonds (Securities and Exchange Commission, 2011). Now, UDI denominated bonds are offered for a period ranging anywhere from 6 months to 30 years.

The Unidad de Valor Constante was introduced in Ecuador to help deal with the high levels of inflation under the then prevailing currency, the sucre. It was later abolished in 2000, when the dollar was adopted as the official currency. While in use, it was utilized widely in the economy of Ecuador for financing housing and for denominating bank deposits(Suarez, 1994).

Brazil witnessed extremely high levels of inflation – as much as 2,947% - in the 1990s. Under the Plano Real, the government introduced the Unidade Real de Valor (URV) in March 1994. The URV was an index used to compulsorily adjust prices in government-controlled markets, especially the labour market. The strategy of the government was to align the movement of most prices with the movement of the URV. Once most prices were closely following the URV, it would be converted into a new currency called the real(da Fonesca, 1998). Although the outcome of this policy was not as had been envisioned initially, this is one of several other examples which showcase the importance and relevance of indexed units of account in protection against inflation.

In 1972, Colombia implanted an indexed unit of account called the Unidad de Valor Real (UVR) in its economy in 2000. It is now used to calculate the cost of housing loans that allows financial institutions to maintain the purchasing power of borrowed money (Banco de la Republica, n.d.). The daily value of the UVR, in terms of Colombian pesos per UVR, is also published on the website of the Banco de la República – the central bank of Colombia.

In each of the above cases, the indexed unit of account has been implemented only when the economy was suffering from exorbitantly high levels of inflation. Instead of following this reactive approach to a situation of hyperinflation, it is advisable that the governments must take on a proactive approach. Indexed units of account are most useful in long-term credit markets. Even in countries with stable levels of inflation, there is always an uncertainty about future price levels. Indexed Units of Accountmay help in lessening the negative impact if the economy experiences high inflation. Moreover, it has other practical applications, as evidenced by the aforementioned examples, such as denomination of housing loans and government securities.

Review of Literature

Undoubtedly, the importance of an Indexed Unit of Account cannot be undermined and maybe considered for conserving the value of the currency. However, very limited published work is available on the subject.

In the literary world, Professor Robert J. Shiller has been the principal proponent of Indexed Units of Account. He explores the importance of and reasons for establishing an indexed unit of account and addresses the problems associated with having such an instrument(Shiller, Indexed Units of Account: Theory and Assessment of Historical Experience, 1998). Shiller also explores the subject from a policy implementation perspective, refuting concerns against Indexed Units of Account with the help of a model, and discussing the changes in the legal framework and monetary policy for the successful introduction of an Indexed Unit of Account (Shiller, Designing Indexed Units of Account, 1999).

H.S. Choi et al (2015) also conducted research on the use of indexed units of account, employing a macroeconomic model to study the role of an Indexed Unit of Account in facilitating credit trades in high inflationary environments (Choi, Kwon, & Lee, 2015).

Aside from the aforementioned, I have not been able to find any published work specifically focused around indexed units of account.

Need for an Indexed Unit of Account

The primary need for an indexed unit of account in the mortgage market stems from the fact that the interest rates currently being charged in the market are not at the true market rate. In 2019, the Reserve Bank of India ordered commercial banks to link their lending rates to external benchmark rates. This move came after four failed attempts and years of moral suasion to ensure that RBI's interest rate actions ripple through the banking system and financial markets. From January 2019 to August 2019, the Monetary Policy Committee of RBI cut down the repo rate[2] by 110 basis points. However, the average lending rates for fresh rupee loans for banks went down by only 34 basis points during that time (Reserve Bank of India, 2019).

It is evident that the current method of pricing loans is not reflective of the true market rate which is why the government wishes to tie it to an external benchmark rate. The benchmark rate suggested by the government is the repo rate. However, inflation is a much better and real time indicator for the benchmark rate. Inflation data is published monthly, whereas the repo rate is changed approximately 3 times per year. Therefore, the CPI reflects better the health of the economy and provides for a more realistic benchmark rate.

Historically, India has been a savings economy. The Gross Domestic Savings Rates for the country have been very high,

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[2]The repo rate is the rate at which the Reserve Bank of India extends loans to the commercial banks.

around 30% of the GDP for the past 15 years. Meanwhile, the corresponding global rate has been approximately 25%, while the rate in developed economies such as the United States is about 17% (World Bank Open Data). A major reason for India having such a high savings rate is partly driven by the social mindset of many Indians, where parents start saving for their children's education and marriage right from birth.In such an environment, an Indexed Unit of Account becomes highly relevant, because marriage expenses and education costs move hand-in-hand with the inflation rate. If there were a mechanism that would move in accordance with inflation, it would offer these households a better way to manage their incomes and to preserve the real value of money even 20 years down the road. Moreover, real interest rates in India are highly volatile. Between 2000 and 2010, real interest rates in the country declined from 9.2% to almost -2%. By 2015, it had risen to 7.5%, after which it again began to decline (World Bank Open Data).

Over the last few decades, we have witnessed rapid globalization. Countries have opened their economies and become economically interlinked, so much so that threat of economic sanctions is used to address politically-charged situations. In such a globalized environment, where the economies are connected to each other and interest rates in one part of the world may be influenced by developments in some other part of the world, there exists a considerable degree of uncertainty about the future value of money. This poses significant risks, especially to longer-dated contracts. It is important for economies to have a system which allows the preservation of the value of money. Intuitively, an indexed unit of account makes most sense in high inflationary environments. However, it is equally relevant in case of other economies as well, especially emerging economies.

Over the years, India has become more integrated into the world economy. In 2007, India exported $145 billion worth of goods. By 2017, this figure had more than doubled to $294 billion. In a similar fashion, its imports have also seen explosive growth, with $218 billion worth of imports in 2007 increasing to $444 billion by 2017. India's share in international trade has also seen an upward trend. In 2007, India's share of total global imports was 1.17%; a number which was at 1.46% as of 2017. We can notice a similar increase in the India's share of global exports as well, rising from 1.35% to 1.96% in thesame time period (World Bank, WITS). In just a span of two years, India witnessed a 45% growth in its share of total global exports and a 25% growth in its share of total global imports. Economic disturbances in any one of India's major trading partners may have a direct and detrimental effect on the Indian economy.

In view of the above, it is important to have a safeguard like an Indexed Unit of Account in order to minimize the negative effects of unforeseen inflation. Its relevance is only bolstered by the precarious nature of the global economic system in today's world, with an ongoing trade war between the United States and China, the uncertainty behind the future of the Brexit. Such disturbances may lead to currency devaluations and their consequent impact on inflation rates will be felt in economies worldwide.

There is another reason for adopting an indexed unit of account in developing economies. Even in countries with stable price levels, the possibility of adopting Indexed Units of Account should be considered as the uncertainty about future price levels poses threat to longer term contracts, and establishing a public habit of using these units is not something that can be achieved in short period of time, especially during an economic crisis. (Shiller 1999). Following a 'prevention is better than cure' ideology, we must recognize the importance of the presence of an indexed unit of account in our economy.

The uncertainty about future price levels in India itself, the fluctuating real interest rates, and the increased risk from integration into the global economy warrant the implementation of an Indexed Unit of Account in India.The same can be applicable to many other developing economies across the world. As they get more entrenched in the international system of commerce, their economies are more prone to risks from external factors which are out of their control. An indexed unit of account is not intended to replace the currency of a country. It is meant to co-exist with the currency, and be used only as a standard of measurement to denominate long-term securities, or in the credit market such as, for infrastructure financing.

In the Indian mortgage market, as well as mortgage markets around the world, we need a fair and transparent system of mortgage pricing. Denominating mortgages in terms of an indexed unit of account is the solution to that problem as it ensures that a fair interest is charged on the mortgage that is in tandem with the inflation rate. In cases of high inflation, it will ensure that the lender is not impacted negatively. While in situations of low inflation it will ensure that the borrower is not paying an unreasonably high rate of interest as compared to the general rise in price level.

History of Indexation in India

Indexation in India has been a slow process. The first introduction of any indexation scheme was in June 2013, when the government introduced Inflation Indexed Bonds (IIBs) successfully for the first time. The government had earlier tried to issue IIBs in 1997 but these were largely unsuccessful and did not attract a lot of attention. This was because although the principal was indexed to inflation, the coupons were linked to a fixed principal.

The new IIBs issued in 2013 were also linked to the Wholesale Price Index (WPI)[3], with an annual interest of

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[3]In April 2014, the CPI replaced the WPI as the primary measure of inflation. The CPI was released beginning January 2011. Monetary policy in the past was targeted to ensure stability in the value of the

1.44% over the headline inflation. This time, both the principal and interest were insulated against inflation. This meant that in the IIBs issued in 2013, the principal was linked to the WPI, and the coupon was based upon the inflation-adjusted principal. These bonds were issued on a monthly basis till December 2013.

However, in January 2016, the Ministry of Finance announced the repurchase of the "1.44 per cent Inflation Indexed Government Stock-2023" through reverse auction for an aggregate amount of Rs. 6,500 crores (Press Information Bureau, Ministry of Finance of India, 2016). This was done after a recommendation by the RBI, with the reasoning that the WPI was no longer the primary measure of inflation in the country. The bonds had lost their relevance, since the CPI was the main focus of RBI's monetary policy. For 5 consecutive months prior to the announcement by the Finance Ministry, WPI headline inflation had been negative. During that same time period, the CPI witnessed a stable, steady increase throughout, except for December – when it dropped by 0.48% compared to the previous month. The principal of the investors was getting diminished, and the bonds were losing value. Therefore, the Ministry decided to repurchase the IIBs. In March 2018, the Department of Economic Affairs indicated that new Inflation Indexed Bonds will be issued in the next fiscal year (FY 2019)[4]. However, this statement did not evolve into a real-world action either.

Aside from Inflation Indexed Bonds, the RBI also took another significant step towards indexation in the Indian economy. This was done by means of introducing Inflation Indexed Nations Saving Securities – Cumulative (IINSS-C) in December 2013. Securities in the form of bonds were issued to retail investors. The nominal rate of interest offered, compounded half yearly, was calculated by adding the inflation rate to a fixed real rate. The fixed real rate was set at 1.50%. So, if inflation for the year was 5%, then the nominal interest rate offered on the security would be 6.5%. The face value of a single security was Rs 5000 with a tenor of 10 years.

However, the attractiveness of this bond was diminished by its tax treatment. The interest on the bonds is taxed under the provisions of the Income Tax Act, 1961. Let us assume that a person invested Rs 5000 into the bonds, with 5% annual inflation and that the person falls in the 30% income tax bracket. Over a period of one year, an interest of approximately Rs 330 will accrue. Out of this, 30% will be taxed by the government, which yields a net of Rs 231 as interest received by the investor. Effectively, he/she gets an interest of 4.6% on his investment, which is lower than the inflation rate of 5%. Hence, the IINSS-C was also not a very attractive option to investors.

WPI. Moreover, the CPI took time to stabilize in value. Hence, the CPI did not replace the WPI until April 2014.
[4]In India, a fiscal year is from April 1 to March 31.

The attractiveness of the bond could have been enhanced by taxing only the real interest rate. If it were done so, then the amount subject to tax would be roughly Rs 75. This yields approximately Rs 305 as interest to the investor. The investor will net a return of roughly 6.1%, which is higher than the rate of inflation.

Indexation has gradually taken place in the country. However, no major strides have taken place that have, as such, made indexed instruments commonplace in the economy.

Feasibility and Applicability of an Indexed Unit of Account in India

In view of indexed units of account, we can draw a parallel with the Sovereign Gold Bonds that were issued by the Reserve Bank of India. The value of the bond was linked to the value of gold in the market and an interest was paid additionally. Similarly, a security denominated in terms of an indexed unit of account would move in tandem with the cost of living (CPI) while offering an interest on the inflation adjusted principal.

An indexed unit of account, where in place, is often used in the housing market to denominate mortgages in order to protect both, the borrowers and the lenders. This is because housing loans are generally long-term in nature, with a maturity period of 15-30 years. This subjects the loan to the ill-effects of inflation. This particular applicability of an indexed unit of account could be of special use in the Indian economy.

The government of India has proposed an ambitious Housing for All by 2022 plan, which seeks to build 20 million homes for the urban poor. In order to finance the purchase of these homes, the people would have to take out a mortgage on their homes and make periodic payments. Interest rates on mortgages in India are between 8.75% and 13.35%.

The practical applicability of an indexed unit of account in the housing sector would be to denominate the housing loan in terms of an indexed unit of account. While a fixed rate of interest would still be charged, the interest to be paid and the principal amount would be denominated in terms of the indexed unit of account. Hence, both the principal loan amount and interest payments would shift in accordance with the rate of inflation in the economy. The fixed rate would simply serve as a mark-up on the inflation rate, and the banks would set this fixed rate as per their standards. If the Housing Finance Companies (HFCs) were to price their loans in terms of an indexed unit of account, it would make the pricing process transparent, and also be beneficial for both consumers and lenders alike.

In the United States, the CPI is often used to adjust payments for rents, wages, alimony, child support and other such obligations whose real value may be affected with a change in inflation. Business organizations are increasingly using the Employment Cost Index (ECI) to adjust long-term sales and contracts and to even adjust wage rates (U.S. Bureau of Labor

Statistics, n.d.). The US Bureau of Labour Statistics even presents a detailed list of recommendations that may be used by private entities wishing to draft indexed contracts of their own. In order to promote indexation by independent, private Indian entities, the RBI may also issue similar guidelines.

However, there is no uniform, enforceable method that specifies the manner in which the value shall be adjusted with regards to an index. In order to bring about transparency and provide a single standard on the basis of which all contacts can be modelled, an indexed unit of account will be more beneficial rather than having each institution devise its own valuation process. With the introduction of an indexed unit of account, agreements can be denominated in it, which obviates the need for negotiations about the manner of valuation. It also makes the contracts more transparent and comprehensible, preventing the exploitation of the general public.

Data

This study utilizes the data of the monthly Consumer Price Index for India from January 2001 to March 2019. The data has been taken from the International Monetary Fund database. This is because the government of India did not publish an all-India CPI before January 2011, and hence using government data for a longer time period was not possible. The primary measure of inflation before the CPI was the Wholesale Price Index. However, using the WPI for the formula has little relevance as the monetary policy in India is now targeted at stabilizing the value of the CPI. Hence, the CPI values have been taken from the IMF database.

The study also uses data from the State Bank of India which is one of the biggest lenders in India. In order to analyse the total payments made on different kinds of home loans, the interest rates offered by the SBI for mortgages at specific times have been used. This data has been obtained from the official website of SBI.

Research Methodology

Linear interpolation is used to determine the daily value of the indexed unit of account. This paper makes use of the same formula that was developed by Robert Shiller to calculate the daily value of a proposed indexed unit of account for the United States of America(Shiller, Indexed Units of Account for the United States, 1997).

The value of the indexed unit of account for the day d of a month is given by the formula:

$$IUoA = \frac{Index(-3) \times (m - d) \ + \ Index(-2) \ \times \ d}{m}$$

Where $IUoA$ is the value of the indexed unit of account, $Index(-t)$ is the monthly index number for the calendar month t months before the month in which day d falls, and m is the number of days in the month in which day d falls. Therefore, if calculating the value of the indexed unit of account for April, you will need the monthly CPI values from January and February.

The value of an indexed unit of account for India (IUA) on the first of every month from April 2001 to March 2019 is calculated using the above formula and inserting the CPI values from the IMF database. These values of the IUA are showed under column 5, titled "IUA Value", of Table 1.

Table 1: Value of Indexed Unit of Account on the first of each month from April 1, 2001 to March 1, 2019

Year	Month	Day	CPI Value	Value of 1 IUA (in INR)
2001	April	1	37.15	36.895
2001	May	1	37.4	36.736
2001	June	1	37.89	36.909
2001	July	1	38.39	37.159
2001	August	1	38.64	37.416
2001	September	1	38.56	37.907
2001	October	1	38.8	38.399
2001	November	1	39.14	38.638
2001	December	1	38.89	38.568
2002	January	1	38.72	38.811
2002	February	1	38.64	39.132
2002	March	1	38.8	38.885
2002	April	1	38.89	38.718
2002	May	1	39.14	38.646
2002	June	1	39.47	38.803
2002	July	1	39.88	38.899
2002	August	1	40.13	39.151
2002	September	1	40.21	39.484
2002	October	1	40.38	39.889
2002	November	1	40.55	40.133
2002	December	1	40.13	40.216
2003	January	1	40.05	40.386
2003	February	1	40.13	40.535
2003	March	1	40.38	40.128
2003	April	1	40.88	40.053
2003	May	1	40.96	40.139
2003	June	1	41.21	40.397
2003	July	1	41.54	40.883
2003	August	1	41.38	40.969
2003	September	1	41.38	41.221
2003	October	1	41.71	41.535
2003	November	1	41.79	41.38
2003	December	1	41.62	41.391
2004	January	1	41.79	41.713
2004	February	1	41.79	41.785
2004	March	1	41.79	41.626
2004	April	1	41.79	41.79
2004	May	1	42.12	41.79
2004	June	1	42.45	41.79
2004	July	1	42.87	41.801
2004	August	1	43.28	42.131
2004	September	1	43.37	42.464
2004	October	1	43.61	42.884
2004	November	1	43.53	43.283
2004	December	1	43.2	43.378
2005	January	1	43.61	43.608
2005	February	1	43.53	43.519
2005	March	1	43.53	43.214

2005	April	1	43.86	43.608		2010	March	1	65.03	64.688
2005	May	1	43.7	43.53		2010	April	1	65.03	65.775
2005	June	1	43.86	43.541		2010	May	1	65.8	65.03
2005	July	1	44.61	43.855		2010	June	1	66.56	65.03
2005	August	1	44.77	43.706		2010	July	1	68.09	65.055
2005	September	1	44.94	43.885		2010	August	1	68.09	65.825
2005	October	1	45.44	44.616		2010	September	1	68.47	66.611
2005	November	1	45.85	44.776		2010	October	1	69.24	68.09
2005	December	1	45.6	44.957		2010	November	1	69.62	68.103
2006	January	1	45.52	45.454		2010	December	1	70.77	68.495
2006	February	1	45.52	45.842		2011	January	1	71.92	69.253
2006	March	1	45.52	45.598		2011	February	1	70.77	69.662
2006	April	1	45.9	45.52		2011	March	1	70.77	70.808
2006	May	1	46.29	45.52		2011	April	1	71.15	71.882
2006	June	1	47.05	45.533		2011	May	1	71.53	70.77
2006	July	1	47.43	45.913		2011	June	1	72.3	70.783
2006	August	1	47.43	46.315		2011	July	1	73.83	71.163
2006	September	1	47.82	47.063		2011	August	1	74.21	71.555
2006	October	1	48.58	47.43		2011	September	1	75.36	72.351
2006	November	1	48.58	47.443		2011	October	1	75.74	73.843
2006	December	1	48.58	47.845		2011	November	1	76.12	74.249
2007	January	1	48.58	48.58		2011	December	1	75.36	75.373
2007	February	1	48.96	48.58		2012	January	1	75.74	75.753
2007	March	1	48.58	48.58		2012	February	1	76.12	76.094
2007	April	1	48.96	48.593		2012	March	1	76.89	75.373
2007	May	1	49.35	48.948		2012	April	1	78.42	75.753
2007	June	1	49.73	48.593		2012	May	1	78.8	76.145
2007	July	1	50.49	48.973		2012	June	1	79.57	76.941
2007	August	1	50.88	49.363		2012	July	1	81.1	78.433
2007	September	1	50.88	49.756		2012	August	1	81.86	78.825
2007	October	1	51.26	50.503		2012	September	1	82.24	79.621
2007	November	1	51.26	50.88		2012	October	1	83.01	81.125
2007	December	1	51.26	50.893		2012	November	1	83.39	81.873
2008	January	1	51.26	51.26		2012	December	1	83.77	82.265
2008	February	1	51.64	51.26		2013	January	1	84.54	83.023
2008	March	1	52.41	51.26		2013	February	1	85.3	83.404
2008	April	1	52.79	51.273		2013	March	1	85.69	83.795
2008	May	1	53.17	51.665		2013	April	1	86.45	84.566
2008	June	1	53.55	52.423		2013	May	1	87.22	85.313
2008	July	1	54.7	52.803		2013	June	1	88.36	85.716
2008	August	1	55.47	53.183		2013	July	1	89.89	86.475
2008	September	1	55.85	53.589		2013	August	1	90.66	87.257
2008	October	1	56.61	54.725		2013	September	1	91.04	88.411
2008	November	1	56.61	55.483		2013	October	1	92.19	89.915
2008	December	1	56.23	55.875		2013	November	1	92.96	90.673
2009	January	1	56.61	56.61		2013	December	1	91.42	91.078
2009	February	1	56.61	56.597		2014	January	1	90.66	92.215
2009	March	1	56.61	56.243		2014	February	1	91.04	92.905
2009	April	1	57.38	56.61		2014	March	1	91.42	91.396
2009	May	1	57.76	56.61		2014	April	1	92.57	90.673
2009	June	1	58.53	56.636		2014	May	1	93.34	91.053
2009	July	1	61.2	57.393		2014	June	1	94.1	91.459
2009	August	1	61.97	57.785		2014	July	1	96.4	92.595
2009	September	1	62.35	58.619		2014	August	1	96.78	93.365
2009	October	1	63.12	61.225		2014	September	1	96.78	94.177
2009	November	1	64.27	61.983		2014	October	1	96.78	96.413
2009	December	1	64.65	62.375		2014	November	1	96.78	96.78
2010	January	1	65.8	63.158		2014	December	1	96.78	96.78
2010	February	1	65.03	64.284		2015	January	1	97.16	96.78

2015	February	1	96.78	96.78
2015	March	1	97.16	96.793
2015	April	1	97.93	97.148
2015	May	1	98.69	96.793
2015	June	1	99.84	97.186
2015	July	1	100.61	97.955
2015	August	1	100.99	98.728
2015	September	1	101.75	99.866
2015	October	1	102.9	100.623
2015	November	1	103.28	101.016
2015	December	1	102.9	101.788
2016	January	1	102.9	102.913
2016	February	1	102.14	103.267
2016	March	1	102.52	102.9
2016	April	1	103.67	102.875
2016	May	1	105.2	102.153
2016	June	1	105.96	102.559
2016	July	1	107.11	103.72
2016	August	1	106.34	105.225
2016	September	1	105.96	105.999
2016	October	1	106.34	107.086
2016	November	1	105.96	106.328
2016	December	1	105.2	105.973
2017	January	1	104.81	106.328
2017	February	1	104.81	105.933
2017	March	1	105.2	105.188
2017	April	1	105.96	104.81
2017	May	1	106.34	104.823
2017	June	1	107.11	105.226
2017	July	1	109.02	105.973
2017	August	1	109.02	106.365
2017	September	1	109.02	107.174
2017	October	1	109.79	109.02
2017	November	1	110.17	109.02
2017	December	1	109.4	109.045
2018	January	1	110.17	109.803
2018	February	1	109.79	110.143
2018	March	1	109.79	109.425
2018	April	1	110.17	110.158
2018	May	1	110.55	109.79
2018	June	1	111.32	109.803
2018	July	1	115.14	110.183
2018	August	1	115.14	110.575
2018	September	1	115.14	111.448
2018	October	1	115.52	115.14
2018	November	1	115.52	115.14
2018	December	1	115.14	115.153
2019	January	1	117.44	115.52
2019	February	1	117.44	115.507
2019	March	1	118.2	115.215

The paper also analyses the structure of mortgage payments under different interest rates for a home loan worth Rs 5,000,000, with a tenure of 5 years. The above has been evaluated for 2 different time periods: 2001-2006 and 2010-2015. These years were chosen as they were periods of moderate and high inflation respectively It is taken that the money was borrowed on 1st April 2001, and 1st April 2010 for the two time periods.

For the loan taken from 2001-2006, the total amount to be paid under a fixed interest mortgage and an IUA-denominated mortgage has been calculated. While for the 2010-2015 home loan, the total amount to be paid under a fixed and floating rate, as well as an IUA-denominated mortgage has been calculated. This is because floating mortgages were not offered by SBI as per April 1, 2001.

Results

The results of the data analysis can be found in Tables 2 and 3. Under the fixed rate loan taken on April 1, 2001, the borrower paid Rs 800,000 more than what he/she would have had to had they taken the loan denominated in terms of IUA.For the SVU-denominated loan taken on April 1, 2010, the borrower paid approximately Rs. 350,000 more as compared to the fixed interest rate and Rs. 250,000 more as compared to the floating interest rate mortgage.

Table 2:Consolidated Table of Results for a loan worth Rs 5,000,000 taken on April 1, 2001 for a period of 5 years

Type of Mortgage	Interest Rate	Total EMI Payments	Interest Paid	Principal Repayment
Fixed Interest	12%	₹ 66,73,334.3	₹ 16,73,334.3	₹ 50,00,000.0
IUA Mortgage (Fixed Interest)	2%	₹ 58,82,653.5	₹ 2,79,769.1	₹ 56,02,884.4

Table 3:Consolidated Table of Results for a loan worth Rs 5,000,000 taken on April 1, 2010 for a period of 5 years

Type of Mortgage	Interest Rate	Total EMI Payments	Interest Paid	Principal Repayment
Fixed Interest	9%	₹ 62,27,506.6	₹ 12,27,506.6	₹ 50,00,000.0
Floating Interest	Year 1:8% Year 2 & 3: 9% Year 4 & onwards: SBAR[5] - 1.75%	₹ 63,16,799.2	₹ 13,16,799.2	₹ 50,00,000.0
IUA Mortgage	2%	₹ 65,73,934.3	₹ 3,00,426.4	₹ 62,73,507.9

In order to explain the disparity between the fixed/floating mortgages and the IUA-denominated mortgages, we need to look at the inflation data. From 2001 to 2006, the average annual inflation rate was around 4%. At this time, the rate at which SBI was charging a fixed rate mortgage was 12%. Due to low inflation, the payments that were linked to the IUA were automatically adjusted and the borrowers would have had to pay much lesser than under the fixed rate mortgage, where the interest rate was 12%. From 2010-2015, the average annual inflation was about 9.4%. At this time, the borrowers

[5]SBAR refers to the State Bank Advance Rate. It is the prime lending rate for the State Bank of India.

were being charged around 8%-9% interest by the bank. The IUA-mortgage has a higher payment during this period as the inflation was high and the indexed payments consequently saw an increase. That explains the disparity between the mortgage payments during the two time periods.

Conclusion

The results of the data analysis show that pricing a mortgage in terms of an indexed unit of account leads to fairer pricing of a home loan. In 2001, inflation was very low, yet the banks charged exorbitantly high rates of interest from the borrowers. If loans were denominated in terms of an indexed unit of account, this exploitation would not have taken place for the payments are directly linked to the price level in the economy.

Similarly, we can observe results from the loan taken in 2010. The 2010-2015 was a very high inflationary period for the Indian economy. However, the bank was charging a rate of interest that was lower than the inflation rate. Hence, the real return on the loan for the bank was actually negative. If denominated in IUAs, the banks would have gotten a return that was appropriate in accordance with the level of inflation in the economy.

The data shows that the IUA fills its purpose of acting as a fair pricing mechanism for longer-term loans. It minimizes the negative effects of the redistribution during high inflation periods and ensures that both parties to a loan are treated fairly during different economic circumstances.

It is clear that there is a need for an indexed unit of account in the Indian mortgage market. Given that the existing market rate is not representative of the true market rate, we need a mechanism that will ensure fair and transparent pricing across the mortgage market. An indexed unit of account sufficiently serves this purpose, and hence must be considered a policy tool to correct the imbalance in the market.

Roadmap for the Implementation of an Indexed Unit of Account in India

Although the government cannot straightaway introduce an indexed unit of account into the economy, it can take steps to ensure that when introduced, it is understood and used widely across the nation.

First and foremost is spreading awareness about the benefits of the indexed-unit-of-account-denominated products and indexation schemes, in general, amongst the public. One can draw inspiration from the campaign pertaining to mutual funds.In the last few years, it has led to widespread acceptance of the product and the assets under management for the mutual fund industry have grown substantially in the last few years. In the FY ended 31st March, 2017, Rs 43,921 crore were collected as investments in SIPs. In the FY ended 31st March, 2019, 99,693 crores were collected as investments in SIPs. The mutual fund industry witnessed more than a two-fold increase in investments in just 2 years' time. If a campaign for

indexed unit of account securities is followed, it could bring about far-reaching benefits across the nation.

There exists already a large latent market for such a product as can be accessed from the huge investor interest for the tax-free bonds issued by the Government. The 8.5 per cent Relief Bond (Tax Free) 2001 which had a currency of only one year received Rs.16,552 crore of subscriptions. Upto January 27, 2004 the subscriptions for the 6.5 per cent Tax Free Bonds 2003 were Rs.15,511 crore (Reserve Bank of India). Tax-free bonds, while very popular with investors, were discontinued by the Government, due to the revenue loss for the Government. The indexed bonds could very well be the instrument that could address both the government and investor concerns – the taxation for the investors should be on the real interest rate and not the nominal interest rate. It would provide a fine balance between maximizing the post-tax returns for the investors and also generate revenues for the government.

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