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Making renewable energy competitive in India: Reducing financing costs via a government-sponsored hedging facility ☆

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HIGHLIGHTS

- We analyze a government-sponsored foreign exchange facility in India.
- We use geometric Brownian motion to represent the INR–USD exchange rate.
- This facility can reduce the currency hedging costs by 50%.
- This facility can reduce the levelized cost of renewable energy by 9%.
- The capital buffer to reach India's sovereign rating is 30% of the original loan.

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ABSTRACT

In India, a significant barrier to market-competitiveness of renewable energy is a shortage of attractive debt. Domestic debt has high cost, short tenors, and variable interest rates, adding 30% to the cost of renewable energy compared to renewable energy projects elsewhere. Foreign debt is as expensive as domestic debt because it requires costly market-based currency hedging solutions. We investigate a government-sponsored foreign exchange facility as an alternative to reducing hedging costs. Using the geometric Brownian motion (GBM)[2] as a representative stochastic model of the INR–USD foreign exchange rate, we find that the expected cost of providing a currency hedge via this facility is 3.5 percentage points, 50% lower than market. This leads to an up to 9% reduction in the per unit cost of renewable energy. However, this requires the government to manage the risks related to unexpected currency movements appropriately. One option to manage these risks is via a capital buffer; for the facility to obtain India's sovereign rating, the capital buffer would need to be almost 30% of the underlying loan. Our findings have significant policy implications given that the Indian government can use this facility to make renewable energy more competitive and, therefore, hasten its deployment.

1. Introduction

1.1. Motivation

India's renewable energy targets of 175 GW by 2022 are ambitious. These primarily rely on 100 GW of solar energy and 60 GW of wind energy, a 7-fold increase compared to currently installed capacities of approximately 3 GW and 22 GW, respectively. However, the Indian government's budget is limited,[3] and cost-effective policy solutions are going to be crucial for achieving those targets.

Achieving these targets cost-effectively faces two major barriers related to availability and terms of debt (Shrimali et al., 2013). The availability of private capital for renewable energy investment during the period 2012–2017 is estimated to be 27% lower than required (RBI, 2012). Furthermore, in regards to terms of debt, high costs (more than 12%), short tenors (less than 10 years), and variable rates (as opposed to fixed), end up increasing the cost of renewable energy in India by 24–32% compared to renewable energy projects elsewhere (Shrimali et al., 2013).

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[2] Acronyms: contract for differences (CfD), foreign exchange (FX), FX hedging facility (FXHF), geometric Brownian motion (GBM), levelized cost of electricity (LCOE), power purchase agreement (PPA).

[3] The budget allocated to India's Ministry of New and Renewable Energy (MNRE) was reduced from USD 246 million in FY2013–14 to USD 72.3 million in FY2014–15 (MNRE, 2014).

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Thus, to achieve India's renewable energy targets cost-effectively, more debt is required at attractive terms – i.e., with reduced costs and extended tenors. Foreign loans (e.g., in USD) are attractive for Indian policymakers, given that cheaper (at 5–7%), longer-term (15 years or more), fixed-rate foreign loans have the potential to reduce the cost of government support by reducing the cost of renewable energy (Shrimali et al., 2013; CPI, 2014a). The FXHF can reduce the cost of debt and given that low cost, long term debt reduces the cost of renewable energy, the FXHF has the potential to reduce the cost of renewable energy.[4]

However, given that renewable projects earn revenues in local currency (in INR), financing a renewable energy by a foreign loan (in USD), the mismatch in the currency of debt obligations and currency of revenue exposes the project to the risk of devaluation in the latter over time,[5] resulting in reduced investments in the country due to the higher perception of risk,[6] and necessitating the use of a currency hedge (or foreign exchange swap) to protect against these devaluations.

But, market-based currency hedging solutions are expensive in India. High costs of hedging increase the final cost of debt, and almost entirely eliminate the benefit of potentially cheaper foreign loans.[7] For example, the typical cost of currency hedging in India is around 7% per year (or higher, depending on the credit rating of the borrower),[8] making completely hedged foreign loans as expensive as domestic loans – i.e., at 12–13% (Shrimali et al., 2013).

Thus, it is clear that reducing the cost of foreign loans via reducing the currency hedging cost can reduce the final cost of debt and, therefore, the cost of capital. This would reduce the delivered cost of renewable energy,[9] and reduce the government cost of support (CPI, 2014a), by making renewable energy more competitive with electricity from fossil fuels (Shrimali et al., 2013). This would also increase the attractiveness of foreign debt compared to domestic debt, mobilize foreign capital and spur investments in renewable energy. This motivates the investigation of provision of cheaper government-supported currency hedging solutions for renewable energy projects as a policy option.

The Government of India has realized that, in order to reach its ambitious renewable targets cost-effectively, cheaper currency hedging mechanisms can play a crucial role, given its role in facilitating provision of low-cost, long-tenor debt. This critically hinges on the finding that renewable energy is still more expensive – 50% or higher – than conventional energy and requires federal policy support (Shrimali et al., 2014). More importantly, provision/facilitation of low-cost, long-tenor debt is the most cost-effective federal policy solution – by 75% or higher compared to existing federal polices[10] – for deploying renewable energy (Shrimali et al., 2014).

The government has demonstrated clear interest in providing cheaper currency hedging for renewable energy, using a currency hedging facility (Economic Times, 2015), using the National Clean Energy Fund which has been created by levying a tax on coal (Mint, 2015). This hedging facility would be available for foreign currency loans obtained by qualified renewable energy projects, ensuring that the advantage of such a facility is targeted towards renewable energy, a policy priority for the Indian government.

This, however, raises the question of whether governments should be actually be involved in the management of currency risk. Given that government policies can influence macroeconomic conditions, which in turn are primary drivers of currency rates (ADBI, 2006); there is an argument for governments providing a currency hedging solution in strategic situations.[11] Given that governments may be in the best position to bear (and respond to) currency risk, they can choose to bear this risk in certain strategic situations, such as deployment of renewable energy.[12] Though such a currency hedging facility is applicable to any sector in the economy, given the government's policy priorities, we have considered it exclusively for renewable energy only.

A further argument for governments, the Indian government in particular, providing cheaper currency hedging is that it helps them reduce import dependence. Bearing the currency risk for renewable energy would offset the currency risk the government takes on future imported fossil-fuel purchases in an import dependent economy like India. In the case of electricity generation in India, this is very relevant for imported coal, the marginal fossil fuel (CPI, 2015).

However, the currency hedging solutions that the government has announced so far do not fully assess the risks associated with foreign exchange (FX) rate hedging adequately. These proposals discuss the average rate the Indian currency (INR) has depreciated against the USD, and propose a facility that addresses this average depreciation. However, currency movements can also be unexpected and uncertain, depending on short-term macro-economic conditions and resulting investor sentiment.[13] This requires an in-depth assessment of not only the expected cost of providing such a hedging facility but also the risk implications.

1.2. Research questions

In this paper, using a representative stochastic model of the USD–INR exchange rate, we analytically examine a foreign

[4] The lowest solar tariff bid in India by SunEdison (at INR 4.63/unit) is speculated to have been possible due to low cost debt (http://www.thehindubusinessline.com/economy/solar-tariffs-in-india-hit-alltime-low-of-rs-463/article7841242.ece). This is at least 10% lower than bids by developers using debt at market rates. These bids typically reflect the levelized cost of electricity.

[5] In theory, INR has a market-determined exchange rate. However, the Reserve Bank of India (RBI) can intervene actively in cases of excessive volatility (HSBC, 2012).

[6] Currency risk is a major barrier to foreign investments in India and other developing countries. Currency crises, defined as a quick decline (more than 20% in one year) of a local currency vis-a-vis USD, have triggered regional economic crises such as in Latin American in 1982. Laeven and Valencia (2013) report 217 currency crises over the period 1970–2011 worldwide. While all projects with foreign investments face currency risk, infrastructure projects are exposed to greater risk because of their longer terms (20–30 years). Further, as Infrastructure assets are difficult to re-deploy, exit is more difficult for investors. Currency risk is more severe for the power sector since its output is not only heavily regulated but also not tradable in international markets.

[7] For currency risk mitigation, foreign infrastructure investments in India have traditionally relied either on market based currency hedging mechanisms or on natural hedging. However, many firms in India are now taking currency risk exposure based on speculation, evident from the fact that more than 75% of external commercial borrowing (ECB) in India is un-hedged. Such decisions are largely driven by the high cost of hedging in the market.

[8] From Bloomberg Terminal, last accessed in January 2015.

[9] For this paper, delivered cost of renewable energy includes the per unit generation (only) cost to the consumer. In most cases, this is the same as the levelized cost, which is the per unit revenue required for a project to be viable; however, in some cases, it may include surcharges.

[10] These policies include viability gap funding (VGF), a form of capital subsidy; accelerated depreciation, a form of tax benefit; and generation based incentive, a form of generation subsidy.

[11] The Indian government has in the past offered currency protection. However, this protection only applied to investments in roads and—most importantly—only in an event of default. This still does not cover the much more likely situation that the project does not default but the local currency depreciates significantly (Lambert, 2014).

[12] The standard principle of risk allocation is based on allocating the risk to the party that may be able to best manage it. For power projects, the parties that can bear the currency risk are – the project developers, the government or the customers. Project developers often bear currency risk. Sometimes, currency risk is passed on to the consumers. However, the government may be in a better position to bear currency risk as it can influence this risk.

[13] Forecasting exchange rates in a deterministic manner is not easy because each of the existing exchange rate theories holds only in specific settings; none contains all the significant factors that could have an impact on currency rates (ADBI, 2006).

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