

World Bank Amazon Reforestation Bond: Concession, financial risk, and complexity

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The World Bank recently issued its biggest outcome bond linked to reforestation in the Amazon. In a typical outcome bond, investors receive principal protection with a guaranteed low coupon and a variable component linked to positive impact, so there is a potential for alignment between financial and sustainability returns.

Following smaller issuances linked to COVID-19 resilience, wildlife conservation, emissions reduction, and plastic waste reduction, this latest instrument, with a principal amount of $225 million, offers an attempt to scale outcome bonds.

Value for investors is dependent on protected principal and low fixed interest payments underpinned by the World Bank, plus a variable component linked to payments from the sale of Carbon Removal Units (CRU) generated by Brazilian start-up company Mombak and purchased by Microsoft. The World Bank proposes this bond as a way to develop natural capital solutions and fund reforestation in the Amazon.

We examine expected returns, consider the complex contractual underpinnings, and note where the risk truly lies in this security. To support the market in digesting these bonds, we offer the following takeaways:

- **Firstly, alignment of financial returns and impact does not seem comprehensive.** At current market yields, the highest return for investors is achieved when reduced payments are made to the reforestation partner, as this way capital is instead returned to investors sooner. We feel that the structure offers a small degree of concessionary financing in return for impact, rather than full alignment. **This appears to be a way of supporting Mombak with an (albeit slightly) lower cost-of-capital, in exchange for reforestation impact.**
- **Secondly, there are financial downside risks.** There is a risk premium for this bond compared to equivalent International Bank for Reconstruction and Development (IBRD) sustainability bonds which indicates an added element of risk potentially from Mombak's reforestation projects, credit concerns around Mombak, or liquidity risk in the Bond. **Current market pricing shows this risk premium is currently around 25bps compared to vanilla sustainability IBRD bonds.**
- **Thirdly, the structure is complex.** It is difficult to obtain the exact specifications of some of the terms of the bond and complex analytics are required to model it, suggesting that this is a hold-to-maturity investment for the various stakeholders. **This cannot be considered a liquid trading instrument, which may impede its ability to scale.**

As such, we opine that while this is an innovative way to provide capital for impact purposes, reducing the complexity may make it easier to scale.

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Landscape: World Bank's outcome bonds

The World Bank introduced outcome bonds to provide public and private capital to development projects, and is actively seeking to scale the structure.[1] These financial instruments typically require the sustainability impact and financial returns for investors to be aligned, so that when greater impact is achieved, coupons are increased, and investors receive higher financial returns.[2,3]

The World Bank recently issued a $225 million outcome bond linked to reforestation projects in the Amazon via the IBRD. This is the biggest outcome bond by some margin (see Table 1), the principal being 50% larger than the wildlife conservation bond issued in 2022. We note that the UNICEF bond generated a higher notional amount for impact projects due to its reduced principal guarantee, though this is repayable by the impact partner.

Table 1. World Bank Outcome Bonds. Source: World Bank, accessed 22 Aug 2024.

Name	Date issued	Maturity date	Principal ($ mm)	Total nominal to impact	Issue price (%)	Redemption and interest
Amazon Reforestation Linked Bond	Aug 20, 2024	Jul 31, 2033	225	$36 mm	100.004	Redeemed at par, principal protected. *Carbon Removal Unit (CRU) linked interest:* Fixed Interest Amount + CRU Linked Interest Amount + Shortfall Catch Up Amount. [4]
Plastic Waste Reduction Linked Bond	Jan 31, 2024	Jan 31, 2031	100	$14 mm	100.000	Redemption at par, principal protected. Additional Redemption Amount based on the average price of the plastic credits sold by Plastic Collective. [5]
Emissions Reduction Linked Bond	Feb 22, 2023	Mar 31, 2028	50	$7.2 mm	97.380	Redemption at par, principal protected. Verified Carbon Unit (VCU) linked interest for water purifier project. [6]
Wildlife Conservation Bond (Rhino Bond)	Mar 23, 2022	Mar 31, 2027	150	ZAR 152 mm (Circa $8.6 mm as at 18 Sept)	94.840	Redemption at par, principal protected. Instead of interest, the IBRD makes conservation payments to parks over the five years. 'Success payment' at maturity. [7]
UNICEF Bond	Mar 4, 2021	Mar 4, 2026	100	$50 mm Repayable by UNICEF.	100.000	World Bank responsible for repayment of half of the principal. UNICEF responsible for providing funds to the World Bank for the repayment of the remainder, so this is semi principal protected. Semi-annual interest. [8]

[1] "Outcome Bonds", World Bank, undated, accessed 12 Sep 2024.
[2] "Outcome Bonds: Linking investor returns to sustainable development project outcomes", World Bank, 30 Oct 2023.
[3] This is in contrast to a typical Sustainability-Linked Bond where higher coupons are typically received when impact targets are missed, as discussed in "Sustainability-Linked Bond Handbook", AFII, 12 May 2024.
[4] See page PT-4 of IBRD $225 mm Amazon Reforestation-Linked Notes.
[5] "World Bank Outcome Bond Mobilizes Private Capital for Projects that Tackle Plastic Pollution", World Bank, undated, accessed 22 Aug 2024.
[6] "Emission Reduction-Linked Notes Mobilize Private Capital for Climate Friendly Project", World Bank, undated, accessed 22 Aug 2024.
[7] "Wildlife Conservation Bond mobilizes private capital to protect critically endangered rhinos", World Bank, undated, accessed 22 Aug 2024.
[8] "World Bank Bond Expands Support to COVID-19 Resilience Through the United Nations Children's Fund (UNICEF)", World Bank, 4 Mar 2021.

Issuance parameters

The $225 million outcome bond, as above, is the largest in the World Bank's line of issuances. This is a nine-year, 100% principal protected instrument. Redemption is at par.[9] The restricted Use of Proceeds (UoP) is for supporting sustainable development in the IBRD's member countries.[10] Though we note that this is a broad definition given the scope of the IBRD's work, it may allow the bond to be treated as a fully sustainable investment product.[11]

Interest is paid on 31 July each year, up to and including the maturity date.[12] This bond is fully principal protected at maturity.

The bond's documentation provides several categories of return for investors:

- **Fixed interest:** There is an initial low-coupon phase, in which only the fixed coupon, 1.745% with a short first coupon, is paid and disbursements totaling $35.7mm over 11 payments to 17 December 2026 are made to Mombak, the entity responsible for reforestation projects.
- **Carbon Removal Unit (CRU) Linked Interest:** If Mombak's projects meet reforestation targets the CRU Linked Interest payments will kick in. These act like a coupon step up, and investor returns increase to potentially 5.476% for some periods.[12,13]
- **Shortfall catch up:** There is a mechanism to decrease the coupon payment if projects lag reforestation targets. The same mechanism also allows for equivalent increases in the coupon payment in future years should reforestation catch up with targets.[14]
- **Return Amount:** In January 2027, any funding not allocated to Mombak via disbursements is returned to investors. Return Amounts are specified in the contract[14] and are equal to unpaid disbursements.

Is this concessionary finance?

For outcome bonds the directionality of sustainability impact and the financial return for investors are considered to be aligned: greater reforestation is associated with better financial returns for investors. However, here we find that under different scenarios there is a less direct alignment of impact and financial return.

Under this bond, disbursements are payments made to Mombak to fund reforestation projects. These disbursements are contractually specified. A disbursement payment is made if the total Expected CRUs (as contractually defined) to be generated by all projects is greater than or equal to

[9] See page PT-5 of IBRD $225 mm Amazon Reforestation-Linked Notes.
[10] See page 4 of IBRD $225 mm Amazon Reforestation-Linked Notes.
[11] We also note that the World Bank has come under some criticism regarding its engagement with the Sustainable Development Goals (SDGs) as reported in "How the World Bank engages with the Sustainable Development Goal on Reducing Inequalities: A Case of Organisational Jiu-Jitsu", Global Studies Quarterly, published Jul 2023.
[12] See page PT-39-41 of IBRD $225 mm Amazon Reforestation-Linked Notes.
[13] Which is reported as an annualized return of 4.362% if the projects perform, see "World Bank prices $225 million bond linked to Amazon reforestation", Reuters, 13 Aug 2024.
[14] See page PT-47-53 of IBRD $225 mm Amazon Reforestation-Linked Notes.

the Cumulative Target Expected CRUs required for the relevant disbursement.[15] The exact threshold is not public.

We estimated the expected return on the bond under 11 disbursement scenarios[16] (Table 2), with the highest NPVs highlighted in blue.[17] We included fixed interest, maximum CRU Linked Interest, Return Amount over the life of the Bond and principal repayment and used yields from 2% to 5% as illustrative examples.[18]

Table 2. Total NPV under different disbursement scenarios under 2% to 5% yield assumptions. The highest NPV under each yield assumption is highlighted in blue. Source IBRD $225 mm Amazon Reforestation-Linked Notes Final Terms.

	NPV ($ mms) under a yield scenario of:						
# of disbursements	2%	2.5%	3%	3.5%	4%	4.5%	5%
1	266.3	256.6	247.2	238.3	229.8	221.7	213.9
2	267.5	257.6	248.2	239.2	230.6	222.4	214.6
3	270.2	260.1	250.4	241.1	232.3	223.8	215.7
4	270.2	260.0	250.3	241.0	232.1	223.6	215.5
5	270.2	259.9	250.2	240.8	231.9	223.4	215.2
6	270.2	259.9	250.1	240.7	231.8	223.2	215.0
7	270.2	259.9	250.0	240.6	231.6	223.0	214.8
8	270.3	259.9	250.0	240.5	231.4	222.8	214.5
9	270.4	259.9	249.9	240.4	231.3	222.6	214.3
10	270.4	259.9	249.8	240.2	231.0	222.2	213.9
11	270.2	259.6	249.4	239.8	230.6	221.8	213.3

The NPV is highest under the three-disbursement scenarios under all yield scenarios down to 2%, where the ten-disbursement scenario gives the highest NPV. This indicates that the three-disbursement scenario is the most likely to drive the highest returns on investment for this bond and that the difference between the NPV under the three-disbursement scenario and the NPV under the 11-disbursement scenario is a concessionary element to Mombak that investors and the IBRD clearly expect.

Investors are sensitive to the number of disbursements. Put simply, if Mombak fails to buy land for reforestation projects, then disbursements are instead repaid to investors, who receive that capital sooner than via the enhanced CRU-Linked Interest Payments. This makes investor returns sensitive to yield. If rates were zero, they would be happy to wait for higher payments via the enhanced coupons. If rates are at market levels, they (from a financial point of view) prefer to receive their money back sooner, although this does expose them to reinvestment risks.

[15] See page PT-22 of International Bank for Reconstruction and Development (IBRD) $225 mm Amazon Reforestation-Linked Notes.

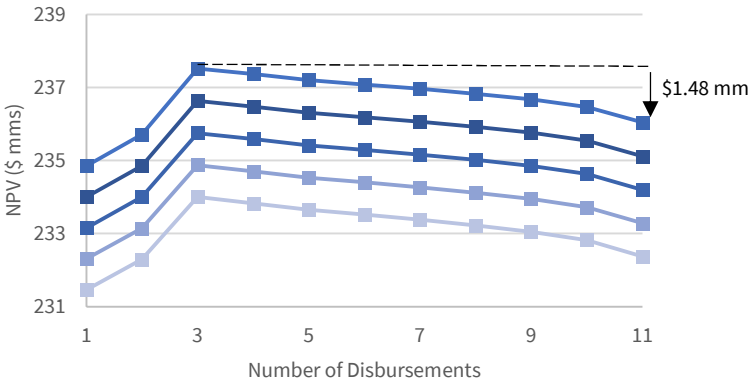
[16] So scenarios under which different numbers of Disbursements are made to Mombak. We start with a scenario under which one Disbursement is made to account for the Confirmation Notice that was already signed as at the date of the Agreement. See page PT-16 of IBRD $225 mm Amazon Reforestation-Linked Notes.

[17] Using a flat yield curve assumption.

[18] This is in line with the yield of 4.02% per Bloomberg as at 16 Sep 2024.

Using 3.7% to 3.9% yield scenarios, which resemble the current 3.75% market yield on the closest comparable vanilla IBRD bond (IBRD 3.875% 34s),[19] this gives us the potential NPVs under different disbursement scenarios. These are shown in Figure 1, which shows a potential $1.48mm concession under a 3.7% yield assumption. This translates indicatively into an annualised concession of 8.3bps over the life of the bond.[20]

Figure 1. Total NPV under different disbursement scenarios focusing on 3.7% to 3.9% yield scenarios. Source: IBRD $225 mm Amazon Reforestation-Linked Notes Final Terms.



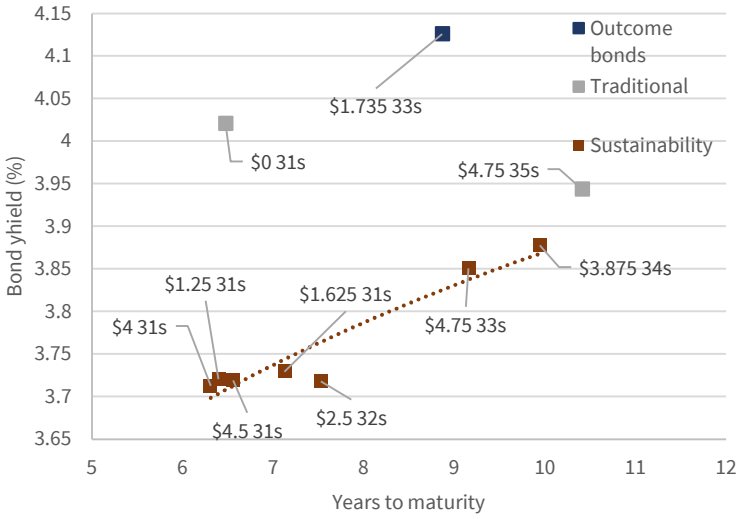
This difference is the effective transfer of value from investors to Mombak. Investor acceptance of this transfer and of the related reinvestment risk indicates that this is the effective value that investors place on Mombak's reforestation efforts. We understand that this bond has been included in both impact and non-impact portfolios, which points to investor recognition of the potential financial upside.

The structure appears to retain a small degree of concessionary financing, in that investors are accepting a slighly lower yield in return for the highest reforestation impact results.

Market pricing

Figure 2 shows the current market pricing for the outcome bond compared with all IBRD non-callable USD bonds with maturity greater than 2030 and size larger than $0.2bn. The sustainability bonds, all of which are >$2bn and were issued since 2020, follow a relatively tight yield curve, with a few outliers. The two traditional bonds are old and small, so do not form part of the trendline, but are included for completeness.[21]

Figure 2. Observed market pricing for the Outcome Bond and comparators. Source: Bloomberg, accessed 20 Sep 2024.



We observe that market pricing currently indicates a premium for this most recent Outcome Bond of circa 25bps compared to the liquid sustainability bonds; the Outcome Bond with full CRU-linked interest as modelled by

[19] Per Bloomberg as at 17 Sep 2024.
[20] Using modified duration of 7.969 from Bloomberg.
[21] IBRD 0% 31s is $0.3bn and was issued in 1991, and IBRD 4.75% 35s is $0.32bn and was issued in 2005.

Bloomberg is trading wide of the IBRD's vanilla bonds. This indicates the market is pricing a higher risk to the additional cash flows. This could be due to uncertainty around the cash flows due as a result of the reforestation projects, or credit concerns around Mombak, or liquidity risks which we highlight in the following section.

We observe that the premium has been present since issuance, though it has tightened slightly since then. The deforestation-linked bond has tightened just under 20bps since issuance (4.34% on 13 Aug to 4.15% on 20 Sep), whereas the comparator bond IBRD 4.75% 33s has tightened 9bps over the same period (3.96% on 13 Aug to 3.87% on 20 Sep). This relative tightening may indicate that investor perceptions of the Bond have improved since issuance.

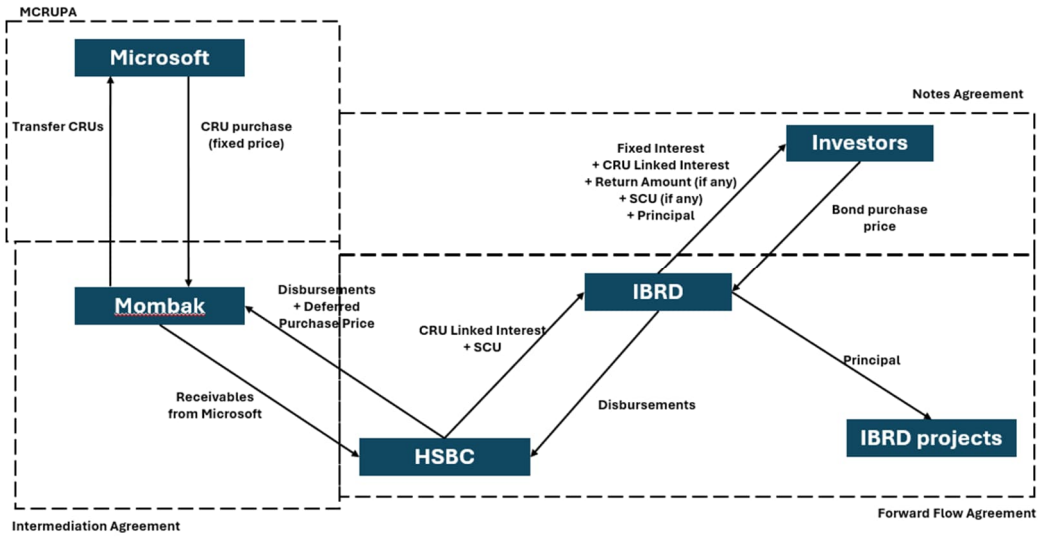
The outcome bond is trading wide of the IBRD's vanilla bonds, which indicates that the market believes there are additional risks to the cash flows that investors will need to consider. These may stem from uncertainty as to the cash flows due as a result of Mombak's reforestation projects, or elevated liquidity risk which we consider in the following section.

Liquidity risk

This is an innovative bond because it combines Use of Proceeds (UoP) and sustainability-linked features. The net proceeds are ringfenced to finance the IBRD's Eligible Sustainable Development Projects,[22] similar to a green bond, but the payout is in part contingent on the variable CRU-Linked Interest, comparable to the coupons found in Sustainability-Linked Bonds (SLB).[3] This complexity, however, may lead to elevated liquidity risk:

1. The highly complex and novel contractual arrangement (see Figure 3) consists of four linked contracts: the Notes Agreement, a Forward Flow Agreement, an Intermediation Agreement, and a Master Carbon Removal Unit Purchase Agreement (MCRUPA). The full details for three of these are only available to holders of the Bond, reducing transparency for the market. The complexity of these agreements impose time and cost constraints on

Figure 3. Contractual arrangements. Source: IBRD $225 mm Amazon Reforestation-Linked Notes Final Terms.



[22] See page 4 of IBRD $225 mm Amazon Reforestation-Linked Notes.

investors that wish to review the Bond. These constraints may decrease the pool of potential investors and so lower liquidity.

2. The bond is exposed to developed market risk due to the principal protection provided by the IBRD. However, the activities underpinning the CRU-Linked Interest payments sit in the emerging markets and a detailed credit analysis is needed to understand the Bond. This adds additional time and resource constraints to potential buyers if they wish to understand the financial aspects in full.

Both factors decrease the pool of potential investors for the bond, leading to a smaller potential market and decreasing potential liquidity. Hence we feel that the bond has an elevated liquidity risk premium.

The complex contractual arrangements and difficulty involved in obtaining the exact specifications for some terms in the bond, as well as analytics needed to model it, suggest that this is a hold-to-maturity investment and should not be considered a liquid trading instrument. This may present challenges in scaling and replicating unless the structure is simplified.

Conclusions

Though this bond is a step forwards in providing nature-positive solutions for investors, certain aspects make it an imperfect template for future issuances.

For investors, the transaction resembles a modest concessionary financing instrument that benefits Mombak. As explained above, the difference in value between the scenario with the highest NPV for investors and the scenario that the IBRD and investors appear to expect is effectively transferred to Mombak. Moreover, from the IBRD's perspective there is some concession inherent to the disbursements themselves. These are in effect exchanged for reforestation impact.

The outcome bond is trading wide of the IBRD's vanilla bonds, with pricing indicating a premium compared to liquid sustainability bonds. This suggests that investors are exposed to potential downside risks. These could include the risk that Mombak does not achieve its reforestation targets, which would trigger reduced coupon payments, credit risks around Mombak as a going concern, and liquidity risk.

The complex contractual arrangements and difficulty obtaining the exact specifications of some terms of the bond indicate that this is a hold-to-maturity investment rather than a liquid trading instrument. This complexity may pose challenges for scaling and replicating the structure unless future instruments are simplified.

Ultimately, this is an innovative way to provide impact capital. However, future decreases in complexity could enable scalability.

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