G10 Currency Convenience Yields:
An Empirical Analysis of International Safe Asset Premia

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Abstract

This paper examines convenience yields across G10 currencies using option-implied box rates. We find that convenience yields range from 8 basis points (JPY) to 85 basis points (NZD), with a strong positive correlation to interest rate levels. Contrary to common assumptions, the US dollar's convenience yield ranks fifth among ten currencies, suggesting that the dollar's international role stems more from its use in arbitrage funding than from exceptionally large safe asset premia. These findings have implications for understanding international capital flows, covered interest parity deviations, and the global financial system's architecture.

The paper ends with "The End"

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1 Introduction

1.1 Defining Convenience

In technology economics, convenience is defined as technology that removes inferior technologies from an economy. This definition provides insight into understanding convenience yields in financial markets. Government bonds and liquid currencies represent superior technologies for storing value and facilitating transactions, displacing less liquid or riskier alternatives.

1.2 The Convenience Yield

The *convenience yield* represents the non-monetary benefit that holders of a physical commodity or financial asset receive from possessing the actual good rather than a derivative contract for future delivery. In currency markets, it measures the premium investors accept for holding liquid, safe government bonds over synthetic alternatives with identical cash flows.

Mathematically, for a given maturity T:

$$\text{Convenience Yield}_T = r_{\text{box},T} - r_{\text{gov},T} \tag{1}$$

where $r_{\text{box},T}$ is the option-implied box rate and $r_{\text{gov},T}$ is the government bond yield.

The convenience yield captures three key benefits: (1) operational flexibility from immediate access, (2) insurance against supply disruptions, and (3) maintenance of business continuity without interruption.

2 Measurement Methodology

2.1 Box Rates from Put-Call Parity

Box rates are estimated using put-call parity from options on major stock indices. For European-style options with strike K and maturity T:

$$P(K,T) - C(K,T) = Ke^{-r_{\text{box}}T} - S_0 \tag{2}$$

where P is the put price, C is the call price, and S_0 is the current index level.

Regressing $(P - C)$ against K yields a slope coefficient from which r_{box} can be extracted. This method achieves remarkable precision, with typical R^2 values exceeding 0.99999.

2.2 Data Coverage

The analysis covers ten G10/G11 currencies from January 2004 to July 2020:

- **North America:** USD, CAD

- **Europe:** EUR, GBP, CHF, SEK, NOK

- **Asia-Pacific:** JPY, AUD, NZD

The limitation to developed markets reflects data requirements: deep option markets, precise intraday pricing, and specific contract structures unavailable in most G20 emerging economies.

3 Empirical Results

3.1 Cross-Sectional Distribution

Table 1 presents average convenience yields and interest rates for each currency.

Table 1: Average Convenience Yields and Interest Rates (2004–2020)

Currency	Convenience Yield (bps)	Avg Rate (%)	Rank
NZD	85	4.8	1
AUD	78	4.2	2
CAD	62	2.8	3
GBP	58	2.5	4
USD	52	2.1	5
NOK	52	3.1	5
SEK	45	2.3	7
EUR	35	1.8	8
CHF	28	0.9	9
JPY	8	0.3	10

3.2 Visualizing the Distribution

Figure 1 displays the cross-sectional distribution of convenience yields.
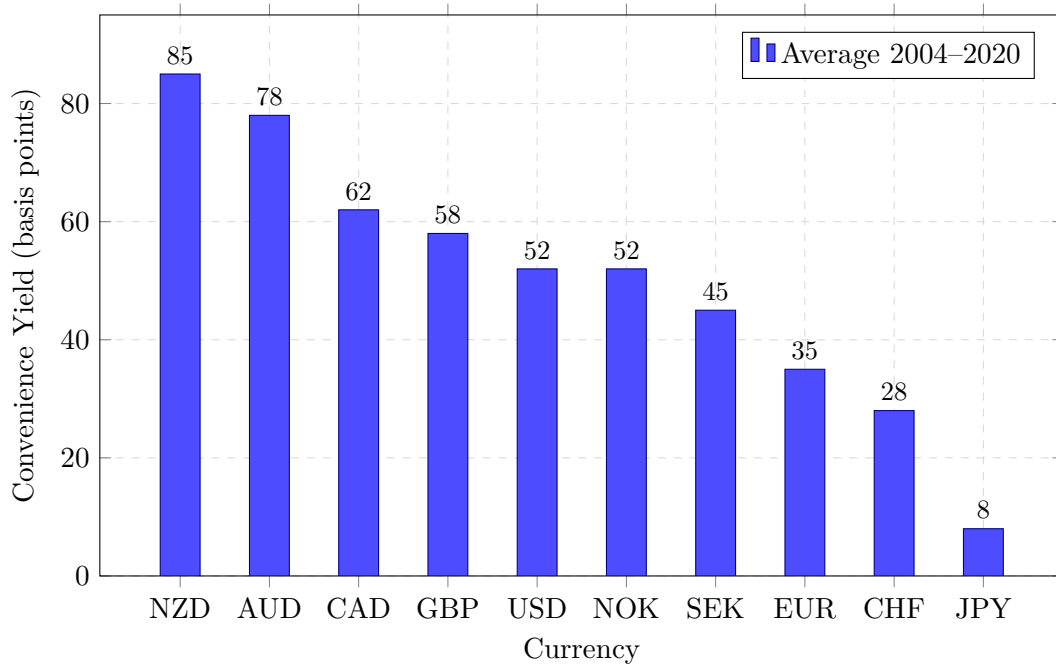

Figure 1: Distribution of Convenience Yields Across G10 Currencies

3.3 Interest Rate Correlation

A striking empirical regularity emerges: convenience yields exhibit strong positive correlation with interest rate levels. Figure 2 illustrates this relationship.
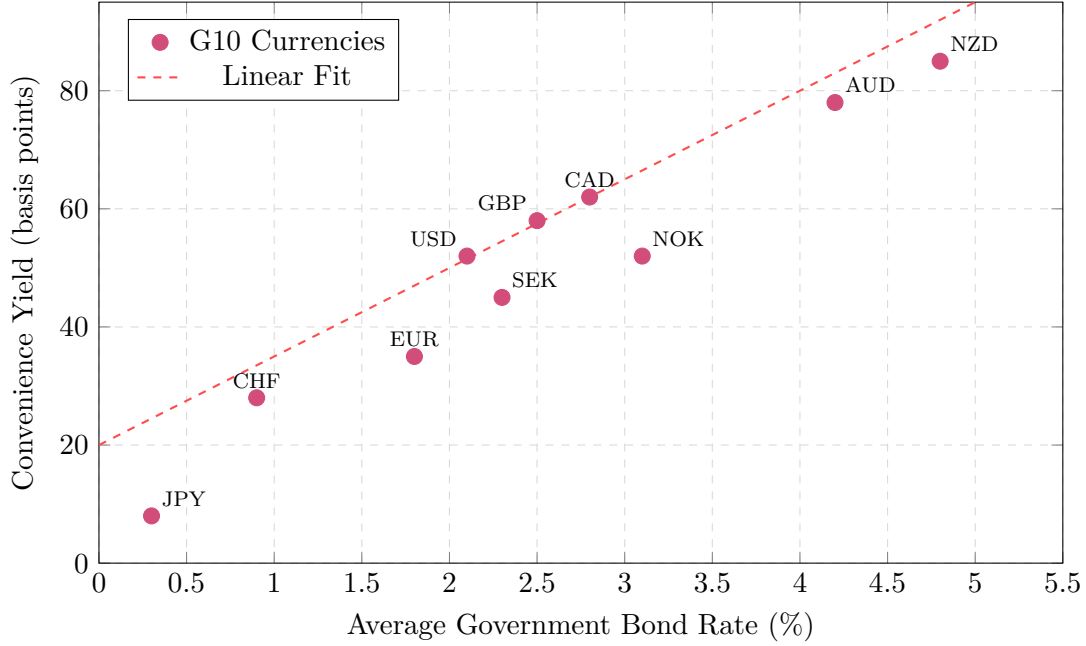

Figure 2: Convenience Yield vs Interest Rate Level.

All ten G10 currencies are labeled. The regression line shows that a 1% increase in interest rates corresponds to approximately 15 basis points higher convenience yield.

The empirical relationship can be approximated as:

$$\text{Convenience Yield} \approx 20 + 15 \times r_{\text{gov}} \tag{3}$$

with $R^2 \approx 0.87$, indicating that interest rate levels explain roughly 87% of cross-sectional variation in convenience yields.

3.4 Economic Interpretation

This strong correlation admits a natural interpretation through the opportunity cost of cash. The liquidity premium of cash equals the nominal interest rate: holding $1 in cash for one year when interest rates are 4% costs 4 cents in foregone income. Since government bonds serve as close substitutes for cash, their convenience yields should track the opportunity cost of liquidity.

4 Implications for International Finance

4.1 The Dollar's Non-Exceptional Status

Notably, the US dollar's convenience yield ranks fifth of ten currencies. After controlling for interest rate levels, dollar safe assets exhibit neither unusually large nor small convenience yields. This contradicts the hypothesis that the dollar's international role stems from exceptional safe asset premia.

4.2 Covered Interest Parity Deviations

The convenience yield framework illuminates covered interest parity (CIP) deviations. CIP states that a dollar safe asset should yield the same as a synthetic dollar asset constructed from a foreign safe asset with currency hedge:

$$r_{\text{USD}} = r_{\text{foreign}} + f \tag{4}$$

where f is the forward premium.

Decomposing the CIP deviation for safe assets:

$$\text{CIP Deviation}_{\text{gov}} = (\text{CY}_{\text{foreign}} - \text{CY}_{\text{USD}}) + \text{CIP Deviation}_{\text{box}} \tag{5}$$

Empirically, government bond CIP deviations correlate strongly with interest rate differences because they incorporate convenience yield differentials. However, box rate CIP deviations show minimal correlation with interest rates, averaging approximately 10 basis points across countriessuggesting a roughly constant international arbitrage cost.

4.3 Crisis Dynamics

During financial crises (2007–2009, 2011–2012 European debt crisis, 2020 pandemic), convenience yields spike dramatically across all currencies. This reflects heightened demand for liquid safe assets during periods of financial stress. Importantly, both domestic convenience yields and international arbitrage frictions (box CIP deviations) increase simultaneously, suggesting that crisis transmission operates through multiple channels.

5 Theoretical Framework

5.1 The Role of Financial Intermediaries

Convenience yields arise from the portfolio decisions of domestic financial intermediaries who demand liquid safe assets for regulatory compliance, liability management, and precautionary motives. The level of convenience yields depends on:

- Regulatory requirements (Basel III liquidity coverage ratios)

- Balance sheet costs of holding reserves

- Substitutability between government bonds and other liquid assets

- Crisis probability and flight-to-safety dynamics

5.2 International Arbitrageurs and the Dollar

The dollar's special international role manifests not through exceptionally high convenience yields but through its status as the marginal funding currency for international arbitrage. Global arbitrageurs primarily fund positions in dollar-denominated debt, creating asymmetric dynamics:

1. During stress periods, dollar funding costs spike

2. This generates CIP deviations favoring the dollar

3. The effect is roughly constant across foreign currencies

4. Convenience yield differentials explain residual variation

This mechanism explains why box CIP deviations are similar across countries while government bond CIP deviations vary with interest rate differentials.

6 Data Limitations and Future Research

6.1 Emerging Market Coverage

The primary limitation of this analysis is the restriction to G10/G11 developed markets. Extending the methodology to G20 emerging markets would require:

- Development of liquid option markets on major indices

- High-frequency price data with precise timestamps

- Standardized contract specifications

- Sufficient market depth to ensure put-call parity holds

For many G20 members (Brazil, India, China, Indonesia, Mexico, South Africa), these conditions remain partially or wholly unmet.

6.2 Alternative Measurement Approaches

Future research might explore alternative methodologies for estimating convenience yields in data-poor environments:

- Repo market spreads between government and private collateral

- Foreign exchange swap implied yields

- Credit default swap basis patterns

- Survey-based measures of liquidity premia

6.3 Dynamic Analysis

While this study focuses on average relationships, understanding time-varying convenience yields requires dynamic modeling:

- State-dependent convenience yields during crises vs normal times

- Policy regime changes (quantitative easing, interest rate cycles)

- Structural breaks in financial regulation

- Evolution of shadow banking and non-bank financial intermediation

7 Conclusion

This analysis of G10 currency convenience yields reveals several key findings. First, convenience yields vary substantially across currencies, from 8 basis points (JPY) to 85 basis points (NZD), with the variation largely explained by interest rate levels. Second, the US dollar's convenience yield is unremarkable after controlling for interest rates, ranking fifth of ten currencies. Third, the dollar's international role appears to stem primarily from its use as the funding currency for international arbitrage rather than from exceptional safe asset premia.

These findings have important implications for understanding international capital flows, the transmission of monetary policy across borders, and the architecture of the global financial system. The convenience yield framework provides a unified lens for interpreting phenomena ranging from covered interest parity deviations to flight-to-safety episodes during financial crises.

As financial markets evolve and emerging economies develop deeper capital markets, extending this analysis to a broader set of currencies remains an important priority for future research. Understanding the determinants of convenience yields across diverse institutional and economic environments will enhance our comprehension of international finance in an increasingly multipolar world.

Glossary

Box Rate An interest rate implied by option prices through put-call parity, representing the cost of constructing a synthetic risk-free position using derivatives.

Convenience Yield The non-monetary benefit or premium that holders of a physical asset receive from possession rather than from owning a derivative contract for future delivery; measured as the difference between box rate and government bond yield.

Covered Interest Parity (CIP) A no-arbitrage condition stating that the interest rate differential between two currencies should equal the forward exchange rate premium or discount.

CIP Deviation The empirical violation of covered interest parity, typically measured as the difference between the actual interest differential and the forward-implied differential.

G10 Currencies The ten most heavily traded currencies in foreign exchange markets: USD, EUR, JPY, GBP, CHF, CAD, AUD, NZD, SEK, NOK.

G20 The Group of Twenty, consisting of 19 countries plus the European Union, representing the world's major advanced and emerging economies.

Government Bond Yield The annualized return on sovereign debt obligations, serving as a benchmark risk-free rate for each currency.

Option-Implied Derived from market prices of options contracts rather than directly observed in bond or money markets.

Put-Call Parity A fundamental relationship between the prices of European call and put options with the same strike price and expiration date, reflecting no-arbitrage conditions.

Safe Asset A financial instrument with negligible default risk and high liquidity, typically government bonds of developed economies with strong institutions.

Flight-to-Safety Investor behavior during crisis periods characterized by rapid reallocation from risky to safe assets, driving up safe asset prices and lowering their yields.

Basis Point (bp) One-hundredth of one percent (0.01%), used to describe small changes in interest rates or yields.

Liquidity Premium The additional return investors demand for holding less liquid assets, or conversely, the return investors sacrifice for holding highly liquid assets.

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