Global Markets Daily: Fed Rate Expectations and G10 FX (Fishman/Pandl)

Karen Reichgott Fishman
+1(212)855-6006 |
karen.fishman@gs.com
Goldman Sachs & Co. LLC

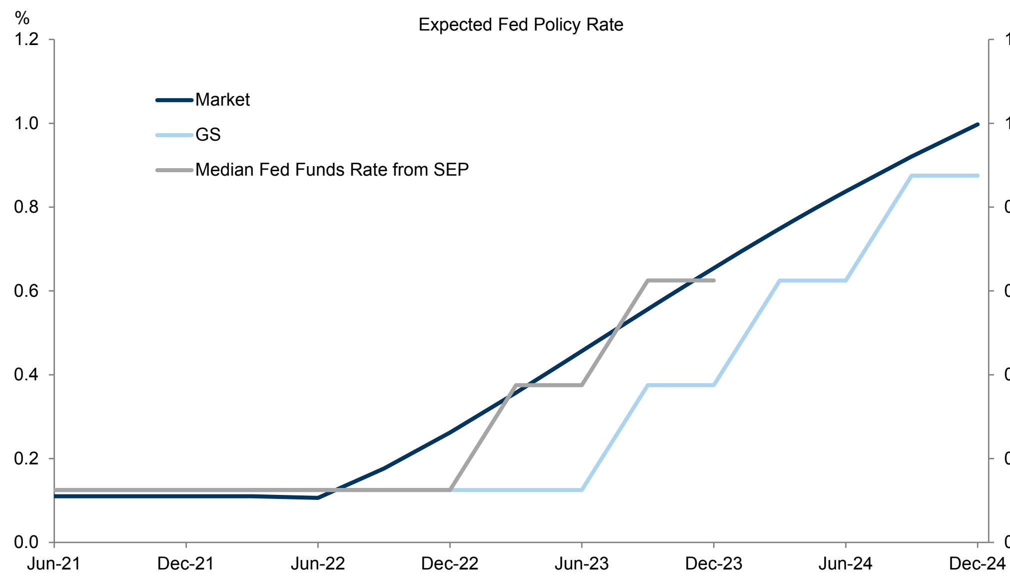
Zach Pandl
+1(212)902-5699 | zach.pandl@gs.com
Goldman Sachs & Co. LLC

- Now that the Fed's plan for tapering asset purchases appears to be priced in, investor focus has shifted to the expected path for rate hikes. As a result, incoming data, such as tomorrow's nonfarm payrolls report, as well as the update of the Summary of Economic Projections (SEP) at the September FOMC meeting—which will newly include "dots" for 2024—could have important FX market implications.
- There are numerous ways to estimate currency sensitivities to shifts in Fed rate expectations. Here, we follow two approaches across G10 Dollar-crosses. The first uses a short-term cyclical (or "BEER") model, while the second uses a factor model. We find that if the market moves to price in, say, an extra 50bp of Fed hikes by end-2024 (all else equal), we could see the Dollar appreciate by roughly 2.5-4% in the typical G10 cross.
- Our relatively dovish Fed forecasts, combined with the Dollar's high valuation and a recovering global economy, underpin our structurally bearish view on the currency. With the latest wave of Covid outbreaks possibly peaking, the Dollar may begin weakening again against pro-cyclical crosses, even if it takes longer for markets to price out early Fed rate hikes.

Fed Rate Expectations and G10 FX

Following the Jackson Hole symposium last week, the Fed's plan for tapering asset purchases appears to be priced in, with a consensus (and our own) expectation of "advance notice" at the September meeting, an official announcement at the November meeting, and commencement in December. Of course, incoming data can still drive market pricing of the policy rate path, including tomorrow's nonfarm payroll report. Moreover, an updated Summary of Economic Projections (SEP) will be published at the September FOMC meeting and could lead investors to adjust their own expectations for the Fed. For example, a relatively dovish outcome could have a median of only 2 hikes in 2024 (or a cumulative 100bp of hikes by end-2024), while a relatively hawkish outcome could have as many as 4 hikes in 2024 (or a cumulative 150bp of hikes by end-2024). There is still plenty of uncertainty around what that number could be, but Exhibit 1 shows that a 4-hike median would be roughly 50bp above current market pricing—even if the market may not necessarily price that outcome. In today's *Global Markets Daily*, we assess how Dollar-crosses might respond to shifts in Fed rate expectations through two different approaches for estimation: a cyclical (or "BEER") model and a factor model.

Exhibit 1: If the September SEP shows a median of 4 additional hikes in 2024, it would stand ~50bp above current pricing



Source: Bloomberg, Federal Reserve Board, Goldman Sachs Global Investment Research

In our first approach, we construct a short-term cyclical model (also known as a "BEER" model) for each G10 Dollar-cross. Over a monthly sample from January 2010 to the present, we regress currency returns versus the Dollar on changes in the 5-year rate differential and control for changes in risk (via the S&P 500 index), oil and copper prices, US 5y5y inflation compensation, European sovereign risk (a GDP-weighted peripheral spread versus Bunds), FX volatility, and the US 5y5y real rate. The only exception is JPY, for which we use the 10-year real rate differential and exclude US 5y5y inflation compensation and the US 5y5y real rate. Our results suggest that a 50bp change in the 5-year rate differential is worth roughly 3.5-4% versus USD on average across G10 currencies (Appendix Table 1). This calculation assumes that all other market variables—e.g. risky assets and FX vol—remain unchanged.

Perhaps a more realistic exercise for estimating FX sensitivities would account for shifts across markets—rather than just rates—in response to a monetary policy surprise. Therefore, we construct a factor model in our second approach, where we extract four common components from a set of cross-asset macro variables[1] and then regress currency returns on the first four principal components using a weekly sample from January 2010 to the present. In this framework, we find a 50bp change in the US 5-year rate, all else equal, is worth roughly 5.5% versus USD across G10 currencies (Appendix Table 2). The larger estimated impact is mostly driven by higher betas for more cyclical

[1] We include the following variables: US Treasury yields (2Y, 5Y, 10, 30), US TIP yields (10Y, 30Y), US breakevens (10Y, 30Y), rate vol, EUR swaps (2Y, 10Y), EUR 10Y inflation swap, EUR 10Y real swap, GBP swaps (2Y, 10Y), JPY 10Y swap, VIX, Euro Stoxx 50 vol, S&P 500 index, Russell 2000 index, Dow Jones index, S&P Consumer Staples Sector index, MSCI World ex US index (local), MSCI EM index (local), Dollar crosses (EUR, JPY, CAD, AUD, EM FX basket), oil, copper, and gold.

currencies, including NOK and AUD. In the factor model approach, a Fed monetary policy "shock" affects both US rates and risky assets, resulting in larger effects for high-beta crosses. For example, the model implies that a 50bp increase in the US 5-year rate would weigh on NOK by about 8.5%. Meanwhile, the same move in rates would weigh on EUR (a more risk-neutral currency) by only 3.5-4%, consistent with the average in our first approach.

We can use both of these tools to more directly estimate the potential impact of a 50bp increase in end-2024 Fed pricing via the OIS curve and its relationship with the 5-year rate. When we regress monthly changes in the US 5-year rate since 2010 on changes in the US 3y1y rate (a rough proxy for end-2024), we find a beta of roughly 0.7.[2] Therefore, we can translate a 50bp move in the policy rate to a shift in the 5-year rate (i.e., 35bp in this case) and then scale the relevant beta in each model to produce an estimated impact. Our results suggest that if the market prices in an extra 50bp of Fed hikes by end-2024, all else equal, we could see the Dollar strengthen by roughly 2.5-4% in the typical G10 cross (Exhibit 2).

Exhibit 2: If the market prices in an extra 50bp of Fed hikes by end-2024, the Dollar could strengthen by 2.5-4%

		Impact of +50bp to End-24 OIS			
	Current Spot	BEER Model Implied		Factor Model Implied	
		%Change	Spot	%Change	Spot
AUD	0.74	-2.5	0.72	-5.2	0.70
CAD	1.26	-2.7	1.29	-3.0	1.30
CHF	0.92	-3.0	0.94	-3.4	0.95
EUR	1.19	-2.7	1.15	-2.7	1.15
GBP	1.38	-2.3	1.35	-2.6	1.34
JPY	110	-1.7	112	-3.3	114
NOK	8.69	-2.9	8.93	-5.9	9.20
NZD	0.71	-2.0	0.69	-5.0	0.67
SEK	8.60	-3.2	8.88	-3.8	8.93
Average		-2.6		-3.9	

Source: Bloomberg, Goldman Sachs Global Investment Research

Another way to explore the potential FX implications for G10 crosses from a shift in Fed policy path expectations is through a set of various outcomes for front-end pricing. We define three scenarios relative to current market pricing: i) "dovish," where lift-off occurs 2 quarters later, but with the same pace of hikes once started, ii) "hawkish," where lift-off remains unchanged, but investors price in a faster pace of hikes (50bp per year) to a terminal rate of 2%, and iii) "very hawkish," where lift-off remains unchanged, but investors price in an even faster pace of hikes (75bp per year) to an even higher terminal rate of 2.5%, in line with the FOMC median in the SEP. When we apply these assumptions to the current OIS curve and calculate the implied 5-year rate, we produce the following approximate shifts from spot: i) -12bp, ii) +18bp, and iii) +44bp. We should also note that the third scenario likely requires a rise in broader market optimism, in addition to hawkish Fed communication. Exhibit 3 shows our results for each scenario following both the BEER model approach and the factor model approach. We find that the average G10 Dollar-cross could *appreciate* by roughly 1% in a dovish outcome, while the average cross could *depreciate* by 1.5-2% in a hawkish scenario and up to 5% in a

[2] For JPY, we run a similar exercise using the US 10-year real rate instead of the 5-year and find a beta of 0.55.

very hawkish scenario.

Exhibit 3: Scenario analysis of shifts in front-end pricing

FX % Change in Response to Shifts in Front-End Pricing via 5-year OIS	BEER Model			Factor Model		
	Dovish (-12bp)	Hawkish (+18bp)	Very Hawkish (+44bp)	Dovish (-12bp)	Hawkish (+18bp)	Very Hawkish (+44bp)
AUD	0.87	-1.31	-3.20	1.79	-2.69	-6.58
CAD	0.91	-1.37	-3.36	1.03	-1.55	-3.80
CHF	1.03	-1.54	-3.78	1.16	-1.74	-4.27
EUR	0.94	-1.42	-3.47	0.93	-1.39	-3.41
GBP	0.80	-1.21	-2.95	0.89	-1.35	-3.30
JPY	0.76	-1.15	-2.81	1.14	-1.71	-4.18
NOK	0.98	-1.48	-3.62	2.04	-3.07	-7.53
NZD	0.68	-1.03	-2.52	1.73	-2.60	-6.38
SEK	1.09	-1.64	-4.03	1.31	-1.97	-4.83
Average	0.90	-1.35	-3.31	1.34	-2.01	-4.92

Note: Scenarios relative to current market pricing. "Dovish" defined as lift-off 2 quarters later, but same pace of hikes. "Hawkish" defined as current lift-off, but faster pace of hikes (50bp per year) to a terminal rate of 2%. "Very hawkish" defined as current lift-off, but even faster pace of hikes (75bp per year) to an even higher terminal rate of 2.5%.

Source: Goldman Sachs Global Investment Research

We consider all of these estimates to be useful rules of thumb, but we should also stress a number of caveats. For starters, we only focus on one side of the cross in these exercises, such that we only apply assumptions for shifts in US rates. In addition, each model is particularly sensitive to sample and specification. We also use the same set of variables across currencies for consistency, but we would preferably adjust the structure on an individual basis to produce a better model fit in a cross-specific forecasting process. Consequently, these models only explain 50-60% of the variation in these crosses on average. Our research shows that many other factors, especially cross-border capital flows, should be important additional inputs to directional currency views.

We have been structurally bearish the Dollar for two main reasons. First, we forecast a slower start to the Fed hiking cycle than currently discounted by markets, with lift-off only in Q3 2023 as slowing domestic growth and lower inflation should allow the FOMC to keep rates on hold until then. Second, we expect a broadly supportive risk environment that should favor pro-cyclical assets, which typically coincides with a weaker Dollar. We have said that several factors could prevent more sustained Dollar weakness, including surprising strength in tomorrow’s nonfarm payroll report, stubbornly high US inflation, and/or the September FOMC meeting “dot plot,” which could show as many as four additional rate hikes in 2024. However, with the latest wave of Covid outbreaks possibly peaking, the Dollar may begin weakening again against pro-cyclical crosses, even if it takes longer for markets to price out early Fed rate hikes.

Appendix Table 1

Monthly Change in:	% Change in G10 FX vs USD AUD	CAD	CHF	EUR	GBP	JPY	NOK	NZD	SEK
Constant	-0.3167 [-1.79]	-0.2977 [-2.52]*	-0.0583 [-0.30]	-0.1073 [-0.69]	-0.1733 [-1.06]	0.0694 [0.37]	-0.4567 [-2.46]*	-0.2625 [-1.27]	-0.2523 [-1.44]
SPX	0.2438 [3.94]**	0.1208 [2.88]**	0.0554 [0.81]	0.0347 [0.63]	0.1186 [2.01]*	-0.2317 [-3.61]**	0.1779 [2.69]**	0.2371 [3.24]**	0.1294 [2.08]*
Oil	0.0184 [0.90]	0.0409 [2.95]**	0.0162 [0.71]	0.0309 [1.69]	0.0354 [1.83]	0.0292 [1.31]	0.1015 [4.64]**	-0.0195 [-0.80]	0.0539 [2.60]*
GDP-Weighted EMU Peripheral Spread	0.432 [0.90]	-0.116 [-0.36]	-0.1008 [-0.19]	-1.7692 [-4.15]**	-0.5223 [-1.15]	0.9601 [1.85]	-1.4244 [-2.80]**	-0.7733 [-1.36]	-1.1536 [-2.39]*
5y Rate Differential (Domestic - Foreign)^	7.223 [7.02]**	7.5784 [8.05]**	8.5295 [5.88]**	7.817 [7.78]**	6.659 [5.59]**	6.3443 [5.74]**	8.1519 [6.22]**	5.6734 [4.90]**	9.0769 [8.79]**
US 5y5y Inflation Compensation	2.4713 [1.53]	3.571 [3.27]**	0.782 [0.42]	3.6305 [2.52]*	4.5382 [3.00]**	-- --	3.2137 [1.86]	2.7196 [1.43]	1.2293 [0.75]
CVIX	-0.6658 [-3.17]**	-0.0857 [-0.60]	-0.208 [-0.88]	-0.37 [-1.99]*	-0.2886 [-1.42]	-0.4744 [-2.08]*	-0.0787 [-0.35]	-0.5476 [-2.21]*	-0.1831 [-0.86]
US 5y5y Real Yield	-1.5652 [-1.63]	0.1619 [0.25]	1.7692 [1.53]	1.5655 [1.80]	1.0475 [1.16]	-- --	0.431 [0.41]	-2.3853 [-2.11]*	1.3478 [1.41]
Copper	0.1533 [4.47]**	0.0943 [4.08]**	0.1349 [3.59]**	0.0803 [2.71]**	0.0113 [0.36]	0.0481 [1.38]	0.0702 [1.93]	0.1959 [4.85]**	0.1085 [3.21]**
Observations:	139	139	139	139	139	139	139	139	139
R-squared:	0.68	0.71	0.44	0.59	0.48	0.31	0.66	0.6	0.62

^10-year real rate differential for JPY.

Note: T-statistics in brackets. ** p<0.05, * p<0.1. Sample period is January 2010-present at a monthly frequency. CHF equation includes a dummy variable for January 2015 to mark the EURCHF peg break.

Source: Goldman Sachs Global Investment Research

Appendix Table 2

Weekly Change in:	% Change in G10 FX vs USD AUD	CAD	CHF	EUR	GBP	JPY	NOK	NZD	SEK	% Change UST5
Constant	-0.0191 [-0.60]	-0.0243 [-0.92]	0.0324 [0.67]	-0.0253 [-0.90]	-0.0167 [-0.42]	-0.023 [-0.69]	-0.0513 [-1.26]	0.0116 [0.28]	-0.0176 [-0.49]	-0.0029 [-1.83]
Growth Factor	0.2548 [26.45]**	0.1811 [22.74]**	0.0087 [0.60]	0.0792 [9.37]**	0.1224 [10.29]**	-0.1474 [-14.59]**	0.2422 [19.72]**	0.1886 [15.33]**	0.1671 [15.33]**	0.0208 [44.32]**
Fed Policy Factor	-0.3263 [-26.51]**	-0.1885 [-18.52]**	-0.2117 [-11.47]**	-0.1691 [-15.65]**	-0.1635 [-10.75]**	-0.2075 [-16.08]**	-0.3733 [-23.78]**	-0.3164 [-20.12]**	-0.2397 [-17.20]**	0.022 [36.75]**
ECB Policy Factor	0.3612 [17.59]**	0.2453 [14.46]**	0.4984 [16.19]**	0.5511 [30.59]**	0.3082 [12.15]**	0.3616 [16.80]**	0.4373 [16.70]**	0.412 [15.71]**	0.5228 [22.49]**	-0.0058 [-5.80]**
Inflation Factor	-0.1523 [-5.97]**	-0.0555 [-2.63]**	-0.0632 [-1.65]	-0.1287 [-5.75]**	-0.033 [-1.05]	-0.0665 [-2.49]*	-0.1152 [-3.54]**	-0.1592 [-4.89]**	-0.133 [-4.60]**	0.0014 [1.09]
Observations:	609	609	609	609	609	609	609	609	609	609
R-squared:	0.74	0.64	0.4	0.68	0.38	0.56	0.67	0.6	0.64	0.85

Note: T-statistics in brackets. ** p<0.05, * p<0.1. Sample period is January 2010-present at a weekly frequency.

Source: Goldman Sachs Global Investment Research

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1. Stay long MYR vs short THB, opened on October 21, 2020, at 7.52, with a target of 8.0, and a revised stop of 7.70, currently trading at 7.78.
2. Stay long SGD vs short TWD, opened on October 29, 2020, at 20.95 (indexed at 100), with a total return target of 106, and a revised stop of 103, currently trading at 105.56.
3. Stay long CMBX 6 BBB- vs. CDX HY index at a 1 to 1.25x notional ratio, opened on February 10, 2021, at 0%, with a target of +10% and a stop of -10%, currently trading at -5.76%.
4. Stay long South Africa and Russia equities, indexed to 100 on March 26, 2021, with a target of 115 and a stop of 92, currently trading at 106.38.
5. Stay long INR versus TWD, opened on April 23, 2021, at 0.374 (indexed at 100), with a target of 108 and a revised stop of 103, currently trading at 104.86.
6. Stay short 2y3y GBP real yields, opened on May 21, 2021, at -3.05%, with a target of -2.50%, and a stop of -3.30%, currently trading at -3.26%.
7. Stay long 5-year KRW IRS payers, opened on May 26, 2021, at 1.51%, with a target of 1.90% and a stop of 1.25%, currently trading at 1.56%.
8. Stay long an EM HY ESG basket, selected based on countries which score high on a 75/25 split of the level and momentum of their ESG scores (Jamaica, Costa Rica, Kenya, Senegal, Ukraine, Dominican Republic, Angola and Oman) for a +2.5% total return target and a revised stop of 0%, currently trading at 1.36%.
9. Stay short 30y bunds, opened on July 23, 2021, at 6bp, with a target of 50bp and a stop of -12bp, currently trading at 12bp.
10. Stay paid INR 5y ND-OIS, opened on August 19, 2021, at 5.16%, with a target of 5.60%, and a stop of 4.85%, currently trading at 5.15%.
11. Stay long 20y UST spreads on the 10s20s30s spread fly, opened August 20, 2021 at -23bp, with a target of -15bp, and a stop of -28bp, currently trading at -22bp.
12. Stay long 10-year OFZs, USD-unhedged, opened on August 26, 2021 at a yield level of 7.02% and with USD/RUB at 74.02, with total return indexed at 100, a target of 110 and a stop of 94, currently trading at 101.85.

Disclosure Appendix

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