

Nubank

Upgrading to Neutral - Profitability to Emerge In 4Q and Delinquencies Contained

We believe Nubank profitability will emerge in 4Q and 2023 and after recent correction (down ~20% vs. Ibov down ~10% last 1 month) we see stock potentially reacting positively, driving a poor risk reward to our previous Underweight. Thus, we upgrade the company to Neutral. Actually, we expect positive short term trends: (i) funding optimization and loans repricing to benefit 4Q22 and 2023 NII trends; (ii) asset quality to remain a risk but unlikely unfolding in 4Q; and (iii) payroll loans helping Nu sustain 2023 loan growth. Another positive to earnings includes Mr. David Velez giving up his shares award, a ~US\$70mn EBT savings per year ([link](#)). On the negative side, interchange cap starts in April and Mexico growth is likely a headwind to EPS. Still, we believe those negatives are mapped. Finally, we are keeping our USD4-4.5 fair value per share range which offers limited upside. Thus despite positive news we set a Neutral rating mostly on valuation. Nubank is now trading at 3.9x 22E P/BV and 37x our above consensus 23E earnings.

- NII growth to remain solid due to funding improvement - despite loan deceleration.** We don't expect Nubank loan growth to remain as solid in 2023. True, Mexico and potential new payroll product may help, but we expect a big deceleration in credit card and ongoing conservative origination in personal loans in Brazil. We forecast 37% total loan growth next year (vs. 84% in 3Q22), divided in 20% in personal loans, 25% credit cards and some ~US\$1.6bn in new segments (i.e. payroll and other). Still, we see NII growing faster than volumes next year (~60% Y-o-Y) due to repricing and more importantly deposits optimization. We forecast funding cost decreasing from ~90% to ~75% of Selic which could mean some ~US\$300mn tailwind to NII.

Latin American Financials

Domingos Falavina ^{AC}

(1-212) 622-3602
domingos.falavina@jpmorgan.com
Bloomberg JPMA FALAVINA <GO>
J.P. Morgan Securities LLC

Yuri R Fernandes

(1-212) 622-3400
yuri.r.fernandes@jpmorgan.com
J.P. Morgan Securities LLC

Guilherme Grespan

(55-11) 4950-3058
guilherme.grespan@jpmorgan.com
Banco J.P. Morgan S.A.

Marlon Medina, CFA

(52-55) 5283-1665
marlon.medinarobles@jpmorgan.com
J.P. Morgan Casa de Bolsa, S.A. de C.V., J.P. Morgan Grupo Financiero

Equity Ratings and Price Targets

Company	Ticker	Mkt Cap (\$ mn)	Price CCY	Price	Rating		Price Target			
					Cur	Prev	Cur	End Date	Prev End Date	
Nubank	NU US	18,565.10	USD	3.97	N	UW	—	—	n/c	n/c
Nubank BDR	NUBR33 BZ	18,481.12	BRL	3.45	N	n/c	—	—	n/c	n/c

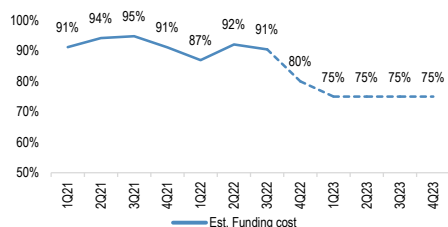
Source: Company data, Bloomberg Finance L.P., J.P. Morgan estimates. n/c = no change. All prices as of 07 Dec 22.

See page 9 for analyst certification and important disclosures, including non-US analyst disclosures.

J.P. Morgan does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

Figure 1: We call for good funding improvement in 2023

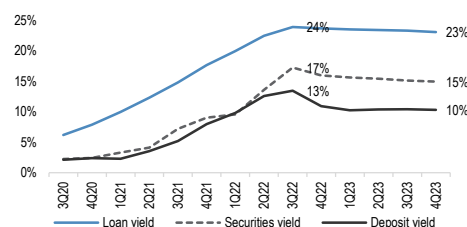
As % of reference rates



Source: Company reports and J.P. Morgan estimates. Funding cost based on "interest and other financial expenses" divided by average deposits, other financial liabilities and financed as % of avg. reference rates in the period.

Figure 2: While loan yields remain healthy

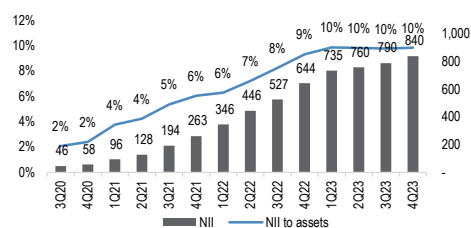
Est. credit, market and funding cost yields



Source: Company reports and J.P. Morgan estimates.

Figure 3: And margin expansion to fuel NII growth

USD mn



Source: Company reports and J.P. Morgan estimates. Assuming annualized NII to total assets as a simplification to NIMs.

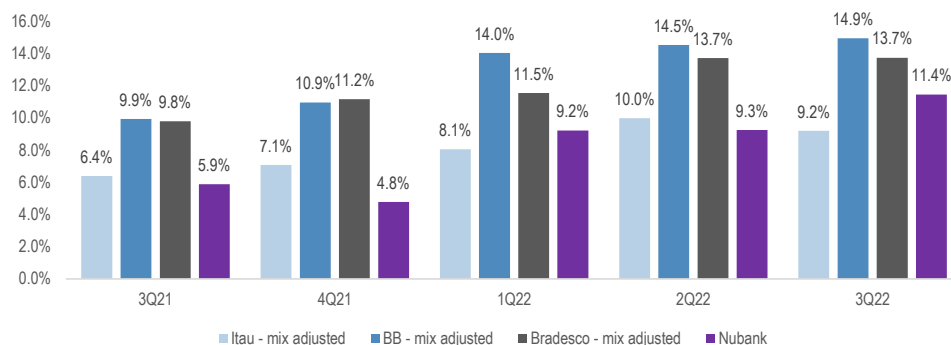
- Incorporating lower share compensation.** As announced by the company, Mr. David Velez, founder, chairman and CEO will no longer receive his ~US\$423mn contingent share award ([link](#)). Though strikes for those awards are far today (share price at USD18.7 and USD35.3), the accounting recognition of it was a US\$70mn EBT impact from 2022-2026 and some residual value until 2029. We adjust our model to reflect those savings.
- Mexico and Colombia - recent NuConta approval and good for clients growth, but EPS headwind.** Nubank has been printing good growth in Mexico (3mn clients) and bit more lackluster trends in Colombia (0.4mn clients). We expect this growth pace to accelerate in Mexico as the company just got the approval ([link](#)) to offer digital checking accounts (NuConta). Notably the company was just issuing credit cards, which have lower approval rates due to credit risk (i.e. management usually mention ~25% approval rates). Now the company may offer a product without credit risk which also allows the growth of deposits - key to success in other markets. On a less positive note, those other markets have more limited scale as of today, thus potentially EPS dilutive in the short term, in our view.
- Prepaid cards volumes to be a small tailwind to financial costs.** There is a lot of discussion about Nubank's average funding cost and money box adoption. We are overall positive on it and we see decreasing funding cost from ~95% to ~75%. We see some peers like PAGs running with retail funding cost closer to ~60%. Notably, we believe Nubank may also marginally benefit from its monthly

prepaid TPV running around ~US\$2.5bn a month (flow, not balance) which implies about ~US\$85mn a day or ~1% of total deposits already at zero remuneration.

- Nubank asset quality has been better than expected in a very challenging environment.** It is not new news that we are seeing a worsening credit cycle in Brazil. Consumer loans NPLs, notably credit card and personal loans, are running at historical high levels. While credit card volumes are growing at 36% Y-o-Y pace we see revolving up 77% in October. Households leverage is at historical high (28.7% debt service) and Brazil reached the record number of 1 billion accounts in the system, meaning about 5x relationships per social security number in the country. In this challenging outlook Nubank is suffering. However, it has been performing in line to better than the market, which we believe is impressive given the company’s higher exposure to lower income clients and to this segment.

Figure 4: Mix adjusted New NPL Formation for individuals - BBDC and BBAS worse than Nubank

Mix adjusted - New NPL Formation divided by individuals or retail loan book excluding payroll and mortgage (eop)



Source: J.P. Morgan estimates. Considering active portfolio sales to estimate the new NPL formation. We recognize this analysis has limitations given different accountings, disclosures, renegotiated trends, transactor balances exposure, among others.

- Adjusting provisions modeling - incorporating stage 3.** We used to model Nubank based on allowance-to-loans, which we believed was a good proxy to reflect expected loss model. In summary, we used to consider a certain % of allowances for loans based on each segment (i.e. ~10-12% for cards and 15% for personal loans). However, this methodology wasn’t incorporating calibrations to credit model - thus higher allowances. Given NPLs have little value to compare vs. peers we decided to adjust our model to incorporate stage 3 loans and stage 3 coverage. We believe this may be a better proxy to asset quality trends.
- All in all - upgrading to Neutral.** We forecast US\$510mn net income in 2023 (~10% ROE) which is almost 70% above Bloomberg consensus (US\$304mn - 17 estimates). However, we are also ~30-20% below consensus in 2024-2025. In our numbers we see Nubank trading at 3.9x 22E book and 37x 23E P/E, which still implies more growth and higher returns in coming years. In summary, while we are getting more positive, our USD4-4.5 fair value per share range still offers limited upside at current share levels.

Adj. EPS Estimate Changes

\$		FY22E			FY23E		
Company	BBG Ticker	Prev	Cur	Δ	Prev	Cur	Δ
Nubank	NU US	0.00	(0.00)	(0.00)	0.08	0.11	0.03
Nubank BDR	NUBR33 BZ	0.00	(0.00)	(0.01)	0.03	0.02	(0.01)

Source: Bloomberg Finance L.P., J.P. Morgan estimates.

Investment Thesis, Valuation and Risks

Nubank *(Neutral)*

Investment Thesis

Nubank is Latin America's most successful Neobank with ~70mn clients as of 3Q22, of which 57mn were active. Impressively, Nubank is among the top 3 players by number of active clients with credit exposure above US\$40. The company started as a branchless payments app focused on credit cards but has quickly evolved to a complete ecosystem with digital accounts, investments, insurance, and more recently marketplace. The absence of maintenance fees and good user experience (90 NPS as of Dec 2021) is driving strong engagement (80% MAU of which about 50% is DAU). In summary, the word-of-mouth effect is leading to fast growth at low customer acquisition cost (US\$5 per user).

Our Neutral recommendation is mostly driven by a valuation that already incorporates meaningful success in most ventures, when execution risks exist (i.e., competition, regulation, credit cycles, etc.). Despite the recent correction, we continue to see valuation as unattractive in a higher rates environment and higher CoE. Additionally, we view tangible addressable markets given Nubank's asset-light structure as potentially not as large when compared to incumbents, considering the lack of some offerings and free of charge services, lower exposure to higher income clients, and distribution of third-party products. On a positive tone, we see 2023 as an important year for profitability to emerge helped by funding cost improvement, operating leverage and cost of risk to remain high, but growing at slower pace. All in all, great company, but limited upside, in our view.

Valuation

We rate Nubank Neutral. Our residual income fair value implies US\$4-4.5 per share, which implies fair multiples around 3.5x to 4.0x 23E P/BV.

We derive our fair value from a three-stage residual income model assuming 30% LT ROE and 12% CoE in USD. In the first stage (2024-33), we forecast Nubank delivering operating leverage and becoming more profitable and growing earnings quickly, especially post 2025. Average ROE in the period is forecasted at ~21%, and we have a ~17% earnings CAGR in those 10 years. In the second stage, we forecast earnings growing at ~7% CAGR as ROE gravitates around ~29%. In the third stage, we forecast 30% LT ROE. Our model is in US\$ and carries FX risks due to the bulk of Nubank's operations being in Brazil in BRL.

Risks to Rating and Price Target

As a Neutral-rated stock, risks are both to the upside and downside.

Upside risk include: (i) higher ARPU than forecast; (ii) more successful global expansion beyond Brazil, Colombia, and Mexico; (iii) more meaningful new products (i.e. payroll) or new initiatives like investments, marketplace among others; and (iv) more efficient operation of branchless distribution.

Risks to the downside include: i) lower client monetization than forecast; ii) unsuccessful LatAm expansion; iii) growing client churn; iv) macroeconomic and currency risk, especially in Brazil; v) tech sell-off globally driving lower valuation multiples; vi) credit cycle in Brazil driven by the already high debt services levels, at ~30% of disposable income close to all-time high; and vii) regulatory changes (i.e., capital, taxation, labor, among others).

Investment Thesis, Valuation and Risks

Nubank BDR (*Neutral*)

Investment Thesis

Nubank is Latin America's most successful Neobank with ~70mn clients as of 3Q22, of which 57mn were active. Impressively, Nubank is the fourth player in Brazil by number of active clients with credit exposure. The company started as a branchless payments app focused on credit cards but has quickly evolved to a complete ecosystem with digital accounts, investments, insurance, and more recently marketplace. The absence of maintenance fees and good user experience (90 NPS as of Dec 2021) is driving strong engagement (73% MAU of which 48% is DAU). In summary, the word-of-mouth effect is leading to fast growth at low customer acquisition cost (US\$5 per user).

Our Neutral recommendation is mostly driven by a valuation that already incorporates meaningful success in most ventures, when execution risks exist (i.e., competition, regulation, credit cycles, etc.). Despite the recent correction, we continue to see valuation as unattractive in a higher rates environment and higher CoE. Additionally, we view tangible addressable markets given Nubank's asset-light structure as potentially not as large when compared to incumbents, considering the lack of some offerings and free of charge services, lower exposure to higher income clients, and distribution of third-party products. On a positive tone, we see 2023 as an important year for profitability to emerge helped by funding cost improvement, operating leverage and cost of risk to remain high, but growing at slower pace. All in all, great company, but limited upside, in our view.

Valuation

We rate Nubank Neutral. Our fair value estimates imply a range of R\$4 to R\$4.5 for Nubank's BDR.

Our valuation is based on a three-stage residual income model assuming 30% LT ROE and 12% CoE in USD. In the first stage (2024-33), we forecast Nubank delivering operating leverage and becoming more profitable and growing earnings quickly, especially post 2025. Average ROE in the period is forecasted at ~21%, and we have a ~17% earnings CAGR in those 10 years. In the second stage, we forecast earnings growing at ~7% CAGR as ROE gravitates around ~29%. In the third stage, we forecast 30% LT ROE. Our model is in US\$ and carries FX risks due to the bulk of Nubank's operations being in Brazil in BRL.

Risks to Rating and Price Target

As a Neutral-rated stock, risks are both to the upside and downside.

Upside risk include: (i) higher ARPU than forecast; (ii) more successful global expansion beyond Brazil, Colombia, and Mexico; (iii) more meaningful new products (i.e. payroll) or new initiatives like investments, marketplace among others; and (iv) more efficient operation of branchless distribution.

Risks to the downside include: i) lower client monetization than forecast; ii) unsuccessful LatAm expansion; iii) growing client churn; iv) macroeconomic and currency risk, especially in Brazil; v) tech sell-off globally driving lower valuation multiples; vi) credit cycle in Brazil driven by the already high debt services levels, at ~30% of disposable income close to all-time high; and vii) regulatory changes (i.e., capital, taxation, labor, among others).

Nubank: Summary of Financials

Income Statement - Annual						Income Statement - Quarterly					
	FY20A	FY21A	FY22E	FY23E	FY24E	1Q22A	2Q22A	3Q22A	4Q22E		
Net interest income	168	679	1,963	3,125	3,685	346A	446A	527A	644		
Non interest income	227	534	1,058	1,242	1,520	223A	257A	275A	303		
Net revenues	395	1,214	3,021	4,367	5,205	570A	702A	803A	947		
Provisions	(169)	(481)	(1,370)	(1,637)	(1,821)	(276)A	(338)A	(375)A	(380)		
Non interest expense	(419)	(903)	(1,662)	(2,093)	(2,483)	(362)A	(388)A	(422)A	(490)		
Employee costs	(266)	(629)	(1,039)	(1,321)	(1,558)	(245)A	(230)A	(262)A	(303)		
Adj. PBT	(193)	(170)	(11)	637	901	(68)A	(25)A	5A	76		
Income taxes	22	5	5	(127)	(225)	23A	(5)A	3A	(15)		
Minority interest	-	-	-	-	-	-	-	-	-		
Adj. Net profit	(70)	(165)	(6)	510	675	(45)A	(30)A	8A	61		
Reported EPS	(0.02)	(0.04)	(0.00)	0.11	0.14	(0.01)A	(0.01)A	0.00A	0.01		
Adj. EPS	(0.02)	(0.04)	(0.00)	0.11	0.14	(0.01)A	(0.01)A	0.00A	0.01		
DPS	0.00	0.00	0.00	0.00	0.04	0.00A	0.00A	0.00A	0.00		
Diluted shares outstanding	4,609	4,609	4,676	4,676	4,676	4,660A	4,676A	4,676A	4,676		
Balance Sheet	FY20A	FY21A	FY22E	FY23E	FY24E	1Q22A	2Q22A	3Q22A	4Q22E		
Cash and cash equivalents	2,344	2,706	3,923	3,531	4,061	2,969A	3,701A	3,693A	3,923		
Net loans	3,084	5,975	9,664	13,284	17,074	7,902A	8,528A	8,973A	9,664		
PP&E	23	488	732	1,099	1,648	548A	576A	586A	732		
LT investments	-	-	-	-	-	-	-	-	-		
Other assets	7,787	16,665	24,662	30,723	38,369	20,741A	20,912A	21,728A	24,662		
Total assets	10,154	19,859	29,318	35,353	44,078	24,258A	25,189A	26,007A	29,318		
Total deposits	5,585	9,667	15,468	19,335	24,168	12,597A	13,293A	14,040A	15,468		
Borrowings	518	165	247	339	433	168A	496A	487A	247		
Total liabilities	9,716	15,416	24,503	30,028	38,246	19,467A	20,451A	21,254A	24,503		
Shareholder equity	438	4,441	4,814	5,324	5,830	4,789A	4,738A	4,753A	4,814		
Total Liabilities and Shareholder Equity	10,154	19,859	29,318	35,353	44,078	24,258A	25,189A	26,007A	29,318		
Book Value Per Share	0.10	0.96	1.03	1.14	1.25	1.03A	1.01A	1.02A	1.03		
Tangible Book Value Per Share	-	-	-	-	-	-	-	-	-		
Balance Sheet Gearing	FY20A	FY21A	FY22E	FY23E	FY24E	Asset Quality/Capital	FY20A	FY21A	FY22E	FY23E	FY24E
Loans/Deposits	55.2%	61.8%	62.5%	68.7%	70.6%	Loan loss reserves/Loans	(7.1%)	(8.8%)	(11.7%)	(11.4%)	(10.8%)
Investment/Assets	-	-	-	-	-	NPLs/Loans	4.1%	3.9%	5.1%	5.7%	5.5%
Loan/Assets	37.8%	32.9%	35.6%	40.1%	43.0%	Loan loss reserves/NPLs	176.1%	211.8%	206.5%	201.6%	202.4%
Customer deposits/Liabilities	57.5%	62.7%	63.1%	64.4%	63.2%	NPL y/y growth	(9.1%)	106.1%	147.5%	31.2%	21.6%
LT debt/Liabilities	5.3%	2.7%	1.0%	1.1%	1.1%	Tier 1 ratio	26.1%	21.8%	11.6%	16.8%	11.0%
Ratio Analysis (%)	FY20A	FY21A	FY22E	FY23E	FY24E	Ratio Analysis (%)	FY20A	FY21A	FY22E	FY23E	FY24E
Net interest margin	2.1%	5.5%	9.2%	10.6%	10.2%	Return on equity (ROE)	(13.4%)	(6.8%)	(0.1%)	10.1%	12.1%
Non interest income/Net revenue	57.5%	44.0%	35.0%	28.4%	29.2%	Return on assets (ROA)	(0.8%)	(1.1%)	(0.0%)	1.6%	1.7%
Non interest income/Avg. Assets	2.7%	3.6%	4.3%	3.8%	3.8%	Return on tangible equity (ROTE)	-	-	-	-	-
Efficiency ratio	106.0%	74.4%	55.0%	47.9%	47.7%	Tax rate	(11.2%)	(2.8%)	(45.0%)	20.0%	25.0%
Leverage ratio	1.1%	3.1%	2.8%	3.7%	4.3%	Net loans y/y growth	8.4%	93.8%	61.7%	37.5%	28.5%
Revenue/Assets	4.7%	8.1%	12.3%	13.5%	13.1%	Assets y/y growth	50.2%	95.6%	47.6%	20.6%	24.7%
RORWA	-	-	-	-	-	RWA y/y growth	196.7%	477.6%	173.4%	20.6%	118.2%
Avg. RWA	248	1,258	4,004	6,467	11,249	Deposits y/y growth	107.4%	73.1%	60.0%	25.0%	25.0%
Avg. IEA	7,852	12,885	20,581	27,210	32,719	Net interest income y/y growth	(26.4%)	304.8%	189.0%	59.2%	17.9%
Gross Loans	3,320	6,555	10,945	14,992	19,140	IE assets/Assets	92.8%	85.9%	83.7%	84.1%	82.4%
P/BV (x)	41.8	4.1	3.9	3.5	3.2	LLP/Loans	(5.3%)	(9.7%)	(15.7%)	(12.6%)	(10.7%)
Adj. P/E (x)	NM	NM	NM	36.4	27.5	Equity/Assets	6.2%	16.3%	18.8%	15.7%	14.0%
Dividend yield	0.0%	0.0%	0.0%	0.0%	0.9%	Cost/Assets	5.0%	6.0%	6.8%	6.5%	6.3%
Dividend payout	0.0%	0.0%	0.0%	0.0%	25.0%	Assets/Equity	16.1	6.2	5.3	6.4	7.1

Source: Company reports and J.P. Morgan estimates.
Note: \$ in millions (except per-share data). Fiscal year ends Dec

Nubank BDR: Summary of Financials

Income Statement - Annual						Income Statement - Quarterly					
	FY20A	FY21A	FY22E	FY23E	FY24E		1Q22A	2Q22A	3Q22A	4Q22E	
Net interest income	168	679	1,963	3,125	3,685	Net interest income	346A	446A	527A	644	
Non interest income	227	534	1,058	1,242	1,520	Non interest income	223A	257A	275A	303	
Net revenues	395	1,214	3,021	4,367	5,205	Net revenues	570A	702A	803A	947	
Provisions	(169)	(481)	(1,370)	(1,637)	(1,821)	Provisions	(276)A	(338)A	(375)A	(380)	
Non interest expense	(419)	(903)	(1,662)	(2,093)	(2,483)	Non interest expense	(362)A	(388)A	(422)A	(490)	
Employee costs	(266)	(629)	(1,039)	(1,321)	(1,558)	Employee costs	(245)A	(230)A	(262)A	(303)	
Adj. PBT	(193)	(170)	(11)	637	901	Adj. PBT	(68)A	(25)A	5A	76	
Income taxes	22	5	5	(127)	(225)	Income taxes	23A	(5)A	3A	(15)	
Minority interest	-	-	-	-	-	Minority interest	-	-	-	-	
Adj. Net profit	(70)	(165)	(6)	510	675	Adj. Net profit	(45)A	(30)A	8A	61	
Reported EPS	(0.00)	(0.01)	(0.00)	0.02	0.02	Reported EPS	(0.00)A	(0.00)A	0.00A	0.00	
Adj. EPS	(0.00)	(0.01)	(0.00)	0.02	0.02	Adj. EPS	(0.00)A	(0.00)A	0.00A	0.00	
DPS	0.00	0.00	0.00	0.00	0.01	DPS	0.00A	0.00A	0.00A	0.00	
Diluted shares outstanding	27,652	27,652	28,058	28,058	28,058	Diluted shares outstanding	27,962A	28,058A	28,058A	28,058	
Balance Sheet	FY20A	FY21A	FY22E	FY23E	FY24E	Balance Sheet	1Q22A	2Q22A	3Q22A	4Q22E	
Cash and cash equivalents	2,344	2,706	3,923	3,531	4,061	Cash and cash equivalents	2,969A	3,701A	3,693A	3,923	
Net loans	3,084	5,975	9,664	13,284	17,074	Net loans	7,902A	8,528A	8,973A	9,664	
PP&E	23	488	732	1,099	1,648	PP&E	548A	576A	586A	732	
LT investments	-	-	-	-	-	LT investments	-	-	-	-	
Other assets	7,787	16,665	24,662	30,723	38,369	Other assets	20,741A	20,912A	21,728A	24,662	
Total assets	10,154	19,859	29,318	35,353	44,078	Total assets	24,258A	25,189A	26,007A	29,318	
Total deposits	5,585	9,667	15,468	19,335	24,168	Total deposits	12,597A	13,293A	14,040A	15,468	
Borrowings	518	165	247	339	433	Borrowings	168A	496A	487A	247	
Total liabilities	9,716	15,416	24,503	30,028	38,246	Total liabilities	19,467A	20,451A	21,254A	24,503	
Shareholder equity	438	4,441	4,814	5,324	5,830	Shareholder equity	4,789A	4,738A	4,753A	4,814	
Total Liabilities and Shareholder Equity	10,154	19,859	29,318	35,353	44,078	Total Liabilities and Shareholder Equity	24,258A	25,189A	26,007A	29,318	
Book Value Per Share	0.02	0.16	0.17	0.19	0.21	Book Value Per Share	0.17A	0.17A	0.17A	0.17	
Tangible Book Value Per Share	-	-	-	-	-	Tangible Book Value Per Share	-	-	-	-	
Balance Sheet Gearing	FY20A	FY21A	FY22E	FY23E	FY24E	Asset Quality/Capital	FY20A	FY21A	FY22E	FY23E	FY24E
Loans/Deposits	55.2%	61.8%	62.5%	68.7%	70.6%	Loan loss reserves/Loans	(7.1%)	(8.8%)	(11.7%)	(11.4%)	(10.8%)
Investment/Assets	-	-	-	-	-	NPLs/Loans	3.8%	4.0%	5.9%	5.6%	5.3%
Loan/Assets	37.8%	32.9%	35.6%	40.1%	43.0%	Loan loss reserves/NPLs	176.1%	211.8%	206.5%	201.6%	202.4%
Customer deposits/Liabilities	57.5%	62.7%	63.1%	64.4%	63.2%	NPL y/y growth	(9.1%)	106.1%	147.5%	31.2%	21.6%
LT debt/Liabilities	5.3%	2.7%	1.0%	1.1%	1.1%	Tier 1 ratio	26.1%	21.8%	11.6%	16.8%	11.0%
Ratio Analysis (%)	FY20A	FY21A	FY22E	FY23E	FY24E	Ratio Analysis (%)	FY20A	FY21A	FY22E	FY23E	FY24E
Net interest margin	2.1%	5.5%	9.2%	10.6%	10.2%	Return on equity (ROE)	(13.4%)	(6.8%)	(0.1%)	10.1%	12.1%
Non interest income/Net revenue	57.5%	44.0%	35.0%	28.4%	29.2%	Return on assets (ROA)	(0.8%)	(1.1%)	(0.0%)	1.6%	1.7%
Non interest income/Avg. Assets	2.7%	3.6%	4.3%	3.8%	3.8%	Return on tangible equity (ROTE)	-	-	-	-	-
Efficiency ratio	106.0%	74.4%	55.0%	47.9%	47.7%	Tax rate	(11.2%)	(2.8%)	(45.0%)	20.0%	25.0%
Leverage ratio	1.1%	3.1%	2.8%	3.7%	4.3%	Net loans y/y growth	8.4%	93.8%	61.7%	37.5%	28.5%
Revenue/Assets	4.7%	8.1%	12.3%	13.5%	13.1%	Assets y/y growth	50.2%	95.6%	47.6%	20.6%	24.7%
RORWA	-	-	-	-	-	RWA y/y growth	196.7%	477.6%	173.4%	20.6%	118.2%
Avg. RWA	248	1,258	4,004	6,467	11,249	Deposits y/y growth	107.4%	73.1%	60.0%	25.0%	25.0%
Avg. IEA	7,852	12,885	20,581	27,210	32,719	Net interest income y/y growth	(26.4%)	304.8%	189.0%	59.2%	17.9%
Gross Loans	3,320	6,555	10,945	14,992	19,140	IE assets/Assets	92.8%	85.9%	83.7%	84.1%	82.4%
P/BV (x)	41.6	4.1	3.8	3.5	3.2	LLP/Loans	(5.3%)	(9.7%)	(15.7%)	(12.6%)	(10.7%)
Adj. P/E (x)	NM	NM	NM	36.2	27.4	Equity/Assets	6.2%	16.3%	18.8%	15.7%	14.0%
Dividend yield	0.0%	0.0%	0.0%	0.0%	0.9%	Cost/Assets	5.0%	6.0%	6.8%	6.5%	6.3%
Dividend payout	0.0%	0.0%	0.0%	0.0%	25.0%	Assets/Equity	16.1	6.2	5.3	6.4	7.1

Source: Company reports and J.P. Morgan estimates.
Note: \$ in millions (except per-share data). Fiscal year ends Dec

Analyst Certification: The Research Analyst(s) denoted by an “AC” on the cover of this report certifies (or, where multiple Research Analysts are primarily responsible for this report, the Research Analyst denoted by an “AC” on the cover or within the document individually certifies, with respect to each security or issuer that the Research Analyst covers in this research) that: (1) all of the views expressed in this report accurately reflect the Research Analyst’s personal views about any and all of the subject securities or issuers; and (2) no part of any of the Research Analyst’s compensation was, is, or will be directly or indirectly related to the specific recommendations or views expressed by the Research Analyst(s) in this report. For all Korea-based Research Analysts listed on the front cover, if applicable, they also certify, as per KOFIA requirements, that the Research Analyst’s analysis was made in good faith and that the views reflect the Research Analyst’s own opinion, without undue influence or intervention.

All authors named within this report are Research Analysts who produce independent research unless otherwise specified. In Europe, Sector Specialists (Sales and Trading) may be shown on this report as contacts but are not authors of the report or part of the Research Department.

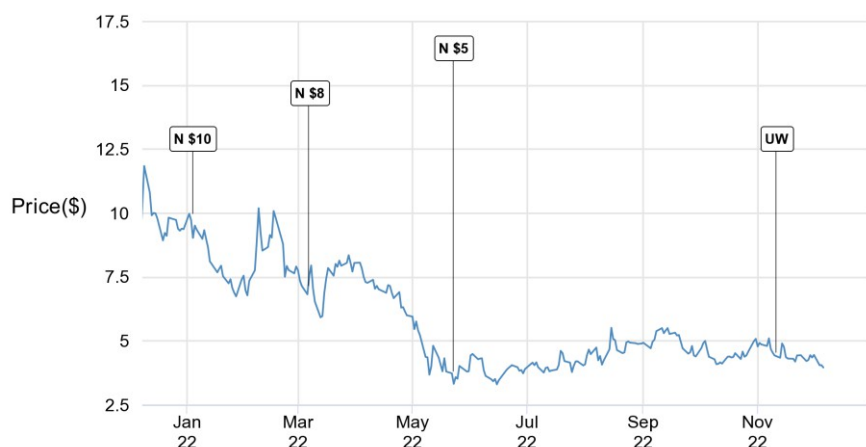
Pursuant to Brazilian regulation, the primary research analyst signing this report certifies that (1) all recommendations expressed herein by the research analyst reflect the analyst’s sole and exclusive personal views and have been independently produced, including from the J.P. Morgan entity in which the research analyst is an employee; and (2) the research analyst responsible for or any research analyst involved in the preparation of this report will disclose herein any situation that impacts or that could impact the impartiality of the recommendations contained in this report or that constitutes or may constitute a conflict of interest.

Important Disclosures

- **Market Maker:** J.P. Morgan Securities LLC makes a market in the securities of Nubank.
- **Market Maker/ Liquidity Provider:** J.P. Morgan is a market maker and/or liquidity provider in the financial instruments of/related to Nubank, Nubank BDR.
- **Client:** J.P. Morgan currently has, or had within the past 12 months, the following entity(ies) as clients: Nubank, Nubank BDR.
- **Client/Non-Investment Banking, Securities-Related:** J.P. Morgan currently has, or had within the past 12 months, the following entity(ies) as clients, and the services provided were non-investment-banking, securities-related: Nubank, Nubank BDR.
- **Client/Non-Securities-Related:** J.P. Morgan currently has, or had within the past 12 months, the following entity(ies) as clients, and the services provided were non-securities-related: Nubank, Nubank BDR.
- **Potential Investment Banking Compensation:** J.P. Morgan expects to receive, or intends to seek, compensation for investment banking services in the next three months from Nubank, Nubank BDR.
- **Non-Investment Banking Compensation Received:** J.P. Morgan has received compensation in the past 12 months for products or services other than investment banking from Nubank, Nubank BDR.
- **Debt Position:** J.P. Morgan may hold a position in the debt securities of Nubank, Nubank BDR, if any.

Company-Specific Disclosures: Important disclosures, including price charts and credit opinion history tables, are available for compendium reports and all J.P. Morgan–covered companies, and certain non-covered companies, by visiting <https://www.jpmm.com/research/disclosures>, calling 1-800-477-0406, or e-mailing research.disclosure.inquiries@jpmorgan.com with your request.

Nubank (NU, NU US) Price Chart



Date	Rating	Price (\$)	Price Target (\$)
04-Jan-22	N	9.98	10
07-Mar-22	N	7.16	8
23-May-22	N	3.81	5
11-Nov-22	UW	4.55	--

Source: Bloomberg Finance L.P. and J.P. Morgan; price data adjusted for stock splits and dividends. Initiated coverage Jan 04, 2022. All share prices are as of market close on the previous business day.

Nubank BDR (NUBR33.SA, NUBR33 BZ) Price Chart



Date	Rating	Price (R\$)	Price Target (R\$)
04-Jan-22	N	9.30	9
07-Mar-22	N	6.09	7
23-May-22	N	3.11	--

Source: Bloomberg Finance L.P. and J.P. Morgan; price data adjusted for stock splits and dividends. Initiated coverage Jan 04, 2022. All share prices are as of market close on the previous business day.

The chart(s) show J.P. Morgan's continuing coverage of the stocks; the current analysts may or may not have covered it over the entire period. J.P. Morgan ratings or designations: OW = Overweight, N= Neutral, UW = Underweight, NR = Not Rated

Explanation of Equity Research Ratings, Designations and Analyst(s) Coverage Universe:

J.P. Morgan uses the following rating system: Overweight [Over the next six to twelve months, we expect this stock will outperform the average total return of the stocks in the analyst's (or the analyst's team's) coverage universe.] Neutral [Over the next six to twelve months, we expect this stock will perform in line with the average total return of the stocks in the analyst's (or the analyst's team's) coverage universe.] Underweight [Over the next six to twelve months, we expect this stock will underperform the average total return of the stocks in the analyst's (or the analyst's team's) coverage universe.] Not Rated (NR): J.P. Morgan has removed the rating and, if applicable, the price target, for this stock because of either a lack of a sufficient fundamental basis or for legal, regulatory or policy reasons. The previous rating and, if applicable, the price target, no longer should be relied upon. An NR designation is not a recommendation or a rating. In our Asia (ex-Australia and ex-India) and U.K. small- and mid-cap equity research, each stock's expected total return is compared to the expected total return of a benchmark country market index, not to those analysts' coverage universe. If it does not appear in the Important Disclosures section of this report, the certifying analyst's coverage universe can be found on J.P. Morgan's research website, <https://www.jpmorganmarkets.com>.

Coverage Universe: Falavina, Domingos: B3 (B3SA3.SA), BTG (BPAC11.SA), Banco Bradesco (BBDC4.SA), Banco Bradesco ADR (BBD), Banco Macro (BMA), Banco Santander Chile (BSAC), Banco de Chile (BCH), Banco do Brasil (BBAS3.SA), Banorte (GFNORTEO.MX), Bolsa Mexicana (BOLSAA.MX), Cielo (CIEL3.SA), Credicorp (BAP), DLocal (DLO), Grupo Financiero Galicia (GGAL), Grupo Financiero Inbursa (GFIBURO.MX), ITAUSA (ITSA4.SA), Itau Unibanco (ITUB4.SA), Itau Unibanco ADR (ITUB), Nubank (NU), Nubank BDR (NUBR33.SA), PagSeguro (PAGS), Patria Investments (PAX), Santander Brasil (SANB11.SA), Santander Brasil ADR (BSBR), Santander Mexico (BSMXB.MX), Santander Mexico ADR (BSMX), Stone (STNE), Vinci Partners (VINP), XP (XP), XP - BDR (XPBR31.SA)

J.P. Morgan Equity Research Ratings Distribution, as of October 01, 2022

	Overweight (buy)	Neutral (hold)	Underweight (sell)
J.P. Morgan Global Equity Research Coverage*	50%	37%	13%
IB clients**	50%	46%	33%
JPMS Equity Research Coverage*	50%	38%	12%
IB clients**	70%	68%	50%

*Please note that the percentages might not add to 100% because of rounding.

**Percentage of subject companies within each of the "buy," "hold" and "sell" categories for which J.P. Morgan has provided investment banking services within the previous 12 months.

For purposes only of FINRA ratings distribution rules, our Overweight rating falls into a buy rating category; our Neutral rating falls into a hold rating category; and our Underweight rating falls into a sell rating category. Please note that stocks with an NR designation are not included in the table above. This information is current as of the end of the most recent calendar quarter.

Equity Valuation and Risks: For valuation methodology and risks associated with covered companies or price targets for covered companies, please see the most recent company-specific research report at <http://www.jpmorganmarkets.com>, contact the primary analyst or your J.P. Morgan representative, or email research.disclosure.inquiries@jpmorgan.com. For material information about the proprietary models used, please see the Summary of Financials in company-specific research reports and the Company Tearsheets, which are available to download on the company pages of our client website, <http://www.jpmorganmarkets.com>. This report also sets out within it the material underlying

assumptions used.

A history of J.P. Morgan investment recommendations disseminated during the preceding 12 months can be accessed on the Research & Commentary page of <http://www.jpmorganmarkets.com> where you can also search by analyst name, sector or financial instrument.

Analysts' Compensation: The research analysts responsible for the preparation of this report receive compensation based upon various factors, including the quality and accuracy of research, client feedback, competitive factors, and overall firm revenues.

Registration of non-US Analysts: Unless otherwise noted, the non-US analysts listed on the front of this report are employees of non-US affiliates of J.P. Morgan Securities LLC, may not be registered as research analysts under FINRA rules, may not be associated persons of J.P. Morgan Securities LLC, and may not be subject to FINRA Rule 2241 or 2242 restrictions on communications with covered companies, public appearances, and trading securities held by a research analyst account.

Other Disclosures

J.P. Morgan is a marketing name for investment banking businesses of JPMorgan Chase & Co. and its subsidiaries and affiliates worldwide.

UK MIFID FICC research unbundling exemption: UK clients should refer to [UK MIFID Research Unbundling exemption](#) for details of JPMorgan's implementation of the FICC research exemption and guidance on relevant FICC research categorisation.

All research material made available to clients are simultaneously available on our client website, J.P. Morgan Markets, unless specifically permitted by relevant laws. Not all research content is redistributed, e-mailed or made available to third-party aggregators. For all research material available on a particular stock, please contact your sales representative.

Any long form nomenclature for references to China; Hong Kong; Taiwan; and Macau within this research material are Mainland China; Hong Kong SAR (China); Taiwan (China); and Macau SAR (China).

J.P. Morgan Research may, from time to time, write on issuers or securities targeted by economic or financial sanctions imposed or administered by the governmental authorities of the U.S., EU, UK or other relevant jurisdictions (Sanctioned Securities). Nothing in this report is intended to be read or construed as encouraging, facilitating, promoting or otherwise approving investment or dealing in such Sanctioned Securities. Clients should be aware of their own legal and compliance obligations when making investment decisions.

Any digital or crypto assets discussed in this research report are subject to a rapidly changing regulatory landscape. For relevant regulatory advisories on crypto assets, including bitcoin and ether, please see <https://www.jpmorgan.com/disclosures/cryptoasset-disclosure>.

The author(s) of this research report may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so.

Exchange-Traded Funds (ETFs): J.P. Morgan Securities LLC ("JPMS") acts as authorized participant for substantially all U.S.-listed ETFs. To the extent that any ETFs are mentioned in this report, JPMS may earn commissions and transaction-based compensation in connection with the distribution of those ETF shares and may earn fees for performing other trade-related services, such as securities lending to short sellers of the ETF shares. JPMS may also perform services for the ETFs themselves, including acting as a broker or dealer to the ETFs. In addition, affiliates of JPMS may perform services for the ETFs, including trust, custodial, administration, lending, index calculation and/or maintenance and other services.

Options and Futures related research: If the information contained herein regards options- or futures-related research, such information is available only to persons who have received the proper options or futures risk disclosure documents. Please contact your J.P. Morgan Representative or visit <https://www.theocc.com/components/docs/riskstoc.pdf> for a copy of the Option Clearing Corporation's Characteristics and Risks of Standardized Options or http://www.finra.org/sites/default/files/Security_Futures_Risk_Disclosure_Statement_2018.pdf for a copy of the Security Futures Risk Disclosure Statement.

Changes to Interbank Offered Rates (IBORs) and other benchmark rates: Certain interest rate benchmarks are, or may in the future become, subject to ongoing international, national and other regulatory guidance, reform and proposals for reform. For more information, please consult: https://www.jpmorgan.com/global/disclosures/interbank_offered_rates

Private Bank Clients: Where you are receiving research as a client of the private banking businesses offered by JPMorgan Chase & Co. and its subsidiaries ("J.P. Morgan Private Bank"), research is provided to you by J.P. Morgan Private Bank and not by any other division of J.P. Morgan, including, but not limited to, the J.P. Morgan Corporate and Investment Bank and its Global Research division.

Legal entity responsible for the production and distribution of research: The legal entity identified below the name of the Reg AC Research Analyst who authored this material is the legal entity responsible for the production of this research. Where multiple Reg AC Research Analysts authored this material with different legal entities identified below their names, these legal entities are jointly responsible for the production of this research. Research Analysts from various J.P. Morgan affiliates may have contributed to the production of this material but may not be licensed to carry out regulated activities in your jurisdiction (and do not hold themselves out as being able to do so). Unless otherwise stated below, this material has been distributed by the legal entity responsible for production. If you have any queries, please contact the relevant Research Analyst in your jurisdiction or the entity in your jurisdiction that has distributed this research material.

Legal Entities Disclosures and Country-/Region-Specific Disclosures:

Argentina: JPMorgan Chase Bank N.A Sucursal Buenos Aires is regulated by Banco Central de la República Argentina (“BCRA”- Central Bank of Argentina) and Comisión Nacional de Valores (“CNV”- Argentinian Securities Commission” - ALYC y AN Integral N°51). **Australia:** J.P. Morgan Securities Australia Limited (“JPMSAL”) (ABN 61 003 245 234/AFS Licence No: 238066) is regulated by the Australian Securities and Investments Commission and is a Market, Clearing and Settlement Participant of ASX Limited and CHI-X. This material is issued and distributed in Australia by or on behalf of JPMSAL only to "wholesale clients" (as defined in section 761G of the Corporations Act 2001). A list of all financial products covered can be found by visiting <https://www.jpmm.com/research/disclosures>. J.P. Morgan seeks to cover companies of relevance to the domestic and international investor base across all Global Industry Classification Standard (GICS) sectors, as well as across a range of market capitalisation sizes. If applicable, in the course of conducting public side due diligence on the subject company(ies), the Research Analyst team may at times perform such diligence through corporate engagements such as site visits, discussions with company representatives, management presentations, etc. Research issued by JPMSAL has been prepared in accordance with J.P. Morgan Australia’s Research Independence Policy which can be found at the following link: [J.P. Morgan Australia - Research Independence Policy](#). **Brazil:** Banco J.P. Morgan S.A. is regulated by the Comissao de Valores Mobiliarios (CVM) and by the Central Bank of Brazil. Ombudsman J.P. Morgan: 0800-7700847 / ouvidoria.jp.morgan@jpmorgan.com. **Canada:** J.P. Morgan Securities Canada Inc. is a registered investment dealer, regulated by the Investment Industry Regulatory Organization of Canada and the Ontario Securities Commission and is the participating member on Canadian exchanges. This material is distributed in Canada by or on behalf of J.P.Morgan Securities Canada Inc. **Chile:** Inversiones J.P. Morgan Limitada is an unregulated entity incorporated in Chile. **China:** J.P. Morgan Securities (China) Company Limited has been approved by CSRC to conduct the securities investment consultancy business. **Dubai International Financial Centre (DIFC):** JPMorgan Chase Bank, N.A., Dubai Branch is regulated by the Dubai Financial Services Authority (DFSA) and its registered address is Dubai International Financial Centre - The Gate, West Wing, Level 3 and 9 PO Box 506551, Dubai, UAE. This material has been distributed by JP Morgan Chase Bank, N.A., Dubai Branch to persons regarded as professional clients or market counterparties as defined under the DFSA rules. **European Economic Area (EEA):** Unless specified to the contrary, research is distributed in the EEA by J.P. Morgan SE (“JPM SE”), which is subject to prudential supervision by the European Central Bank (“ECB”) in cooperation with BaFin and Deutsche Bundesbank in Germany. JPM SE is a company headquartered in Frankfurt with registered address at TaunusTurm, Taunustor 1, Frankfurt am Main, 60310, Germany. The material has been distributed in the EEA to persons regarded as professional investors (or equivalent) pursuant to Art. 4 para. 1 no. 10 and Annex II of MiFID II and its respective implementation in their home jurisdictions (“EEA professional investors”). This material must not be acted on or relied on by persons who are not EEA professional investors. Any investment or investment activity to which this material relates is only available to EEA relevant persons and will be engaged in only with EEA relevant persons. **Hong Kong:** J.P. Morgan Securities (Asia Pacific) Limited (CE number AAJ321) is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission in Hong Kong, and J.P. Morgan Broking (Hong Kong) Limited (CE number AAB027) is regulated by the Securities and Futures Commission in Hong Kong. JP Morgan Chase Bank, N.A., Hong Kong (CE Number AAL996) is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission, is organized under the laws of the United States with limited liability. Where the distribution of this material is a regulated activity in Hong Kong, the material is distributed in Hong Kong by or through J.P. Morgan Securities (Asia Pacific) Limited and/or J.P. Morgan Broking (Hong Kong) Limited. **India:** J.P. Morgan India Private Limited (Corporate Identity Number - U67120MH1992FTC068724), having its registered office at J.P. Morgan Tower, Off. C.S.T. Road, Kalina, Santacruz - East, Mumbai – 400098, is registered with the Securities and Exchange Board of India (SEBI) as a ‘Research Analyst’ having registration number INH000001873. J.P. Morgan India Private Limited is also registered with SEBI as a member of the National Stock Exchange of India Limited and the Bombay Stock Exchange Limited (SEBI Registration Number – INZ000239730) and as a Merchant Banker (SEBI Registration Number - MB/INM000002970). Telephone: 91-22-6157 3000, Facsimile: 91-22-6157 3990 and Website: <http://www.jpiml.com>. JPMorgan Chase Bank, N.A. - Mumbai Branch is licensed by the Reserve Bank of India (RBI) (Licence No. 53/ Licence No. BY.4/94; SEBI - IN/CUS/014/ CDSL : IN-DP-CDSL-444-2008/ IN-DP-NSDL-285-2008/ INBI00000984/ INE231311239) as a Scheduled Commercial Bank in India, which is its primary license allowing it to carry on Banking business in India and other activities, which a Bank branch in India are permitted to undertake. For non-local research material, this material is not distributed in India by J.P. Morgan India Private Limited. **Indonesia:** PT J.P. Morgan Sekuritas Indonesia is a member of the Indonesia Stock Exchange and is registered and supervised by the Otoritas Jasa Keuangan (OJK). **Korea:** J.P. Morgan Securities (Far East) Limited, Seoul Branch, is a member of the Korea Exchange (KRX). JPMorgan Chase Bank, N.A., Seoul Branch, is licensed as a branch office of foreign bank (JPMorgan Chase Bank, N.A.) in Korea. Both entities are regulated by the Financial Services Commission (FSC) and the Financial Supervisory Service (FSS). For non-macro research material, the material is distributed in Korea by or through J.P. Morgan Securities (Far East) Limited, Seoul Branch. **Japan:** JPMorgan Securities Japan Co., Ltd. and JPMorgan Chase Bank, N.A., Tokyo Branch are regulated by the Financial Services Agency in Japan. **Malaysia:** This material is issued and distributed in Malaysia by JPMorgan Securities (Malaysia) Sdn Bhd (18146-X), which is a Participating Organization of Bursa Malaysia Berhad and holds a Capital Markets Services License issued by the Securities Commission in Malaysia. **Mexico:** J.P. Morgan Casa de Bolsa, S.A. de C.V. and J.P. Morgan Grupo Financiero are members of the Mexican Stock Exchange and are authorized to act as a broker dealer by the National Banking and Securities Exchange Commission. **New Zealand:** This material is issued and distributed by JPMSAL in New Zealand only to "wholesale clients" (as defined in the Financial Markets Conduct Act 2013). JPMSAL is registered as a Financial Service Provider under the Financial Service providers (Registration and Dispute Resolution) Act of 2008. **Pakistan:** J. P. Morgan Pakistan Broking (Pvt.) Ltd is a member of the Karachi Stock Exchange and regulated by the Securities and Exchange Commission of Pakistan. **Philippines:** J.P. Morgan Securities Philippines Inc. is a Trading Participant of the Philippine Stock Exchange and a member of the Securities Clearing Corporation of the Philippines and the Securities Investor Protection Fund. It is regulated by the Securities and Exchange Commission. **Russia:** CB J.P. Morgan Bank International LLC is regulated by the Central Bank of Russia. **Singapore:** This material is issued and distributed in Singapore by or through J.P. Morgan Securities Singapore Private Limited (JPMS) [MCI (P) 060/08/2022 and Co. Reg. No.: 199405335R], which is a member of the Singapore Exchange Securities Trading Limited, and/or JPMorgan Chase Bank, N.A., Singapore branch (JPMCB Singapore), both of which are regulated by the Monetary Authority of Singapore. This material is issued and distributed in Singapore only to accredited investors, expert investors and institutional investors, as defined in Section 4A of the

Securities and Futures Act, Cap. 289 (SFA). This material is not intended to be issued or distributed to any retail investors or any other investors that do not fall into the classes of “accredited investors,” “expert investors” or “institutional investors,” as defined under Section 4A of the SFA. Recipients of this material in Singapore are to contact JPMSS or JPMCB Singapore in respect of any matters arising from, or in connection with, the material. As at the date of this material, JPMSS is a designated market maker for certain structured warrants listed on the Singapore Exchange where the underlying securities may be the securities discussed in this material. Arising from its role as a designated market maker for such structured warrants, JPMSS may conduct hedging activities in respect of such underlying securities and hold or have an interest in such underlying securities as a result. The updated list of structured warrants for which JPMSS acts as designated market maker may be found on the website of the Singapore Exchange Limited: <http://www.sgx.com>. **South Africa:** J.P. Morgan Equities South Africa Proprietary Limited and JPMorgan Chase Bank, N.A., Johannesburg Branch are members of the Johannesburg Securities Exchange and are regulated by the Financial Services Board. **Taiwan:** J.P. Morgan Securities (Taiwan) Limited is a participant of the Taiwan Stock Exchange (company-type) and regulated by the Taiwan Securities and Futures Bureau. Material relating to equity securities is issued and distributed in Taiwan by J.P. Morgan Securities (Taiwan) Limited, subject to the license scope and the applicable laws and the regulations in Taiwan. According to Paragraph 2, Article 7-1 of Operational Regulations Governing Securities Firms Recommending Trades in Securities to Customers (as amended or supplemented) and/or other applicable laws or regulations, please note that the recipient of this material is not permitted to engage in any activities in connection with the material that may give rise to conflicts of interests, unless otherwise disclosed in the “Important Disclosures” in this material. **Thailand:** This material is issued and distributed in Thailand by JPMorgan Securities (Thailand) Ltd., which is a member of the Stock Exchange of Thailand and is regulated by the Ministry of Finance and the Securities and Exchange Commission, and its registered address is 3rd Floor, 20 North Sathorn Road, Silom, Bangrak, Bangkok 10500. **UK:** Unless specified to the contrary, research is distributed in the UK by J.P. Morgan Securities plc (“JPMS plc”) which is a member of the London Stock Exchange and is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. JPMS plc is registered in England & Wales No. 2711006, Registered Office 25 Bank Street, London, E14 5JP. This material is directed in the UK only to: (a) persons having professional experience in matters relating to investments falling within article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) (Order) 2005 (“the FPO”); (b) persons outlined in article 49 of the FPO (high net worth companies, unincorporated associations or partnerships, the trustees of high value trusts, etc.); or (c) any persons to whom this communication may otherwise lawfully be made; all such persons being referred to as “UK relevant persons”. This material must not be acted on or relied on by persons who are not UK relevant persons. Any investment or investment activity to which this material relates is only available to UK relevant persons and will be engaged in only with UK relevant persons. Research issued by JPMS plc has been prepared in accordance with JPMS plc’s policy for prevention and avoidance of conflicts of interest related to the production of Research which can be found at the following link: [J.P. Morgan EMEA - Research Independence Policy](#). U.S.: J.P. Morgan Securities LLC (“JPMS”) is a member of the NYSE, FINRA, SIPC, and the NFA. JPMorgan Chase Bank, N.A. is a member of the FDIC. Material published by non-U.S. affiliates is distributed in the U.S. by JPMS who accepts responsibility for its content.

General: Additional information is available upon request. The information in this material has been obtained from sources believed to be reliable. While all reasonable care has been taken to ensure that the facts stated in this material are accurate and that the forecasts, opinions and expectations contained herein are fair and reasonable, JPMorgan Chase & Co. or its affiliates and/or subsidiaries (collectively J.P. Morgan) make no representations or warranties whatsoever to the completeness or accuracy of the material provided, except with respect to any disclosures relative to J.P. Morgan and the Research Analyst’s involvement with the issuer that is the subject of the material. Accordingly, no reliance should be placed on the accuracy, fairness or completeness of the information contained in this material. There may be data discrepancy in this material as a result of calculations, adjustments and/or translations to different languages, as applicable. J.P. Morgan accepts no liability whatsoever for any loss arising from any use of this material or its contents, and neither J.P. Morgan nor any of its respective directors, officers or employees, shall be in any way responsible for the contents hereof, apart from the liabilities and responsibilities that may be imposed on them by the relevant regulatory authority in the jurisdiction in question, or the regulatory regime thereunder. Opinions, forecasts or projections contained in this material represent J.P. Morgan’s current opinions or judgment as of the date of the material only and are therefore subject to change without notice. Periodic updates may be provided on companies/industries based on company-specific developments or announcements, market conditions or any other publicly available information. There can be no assurance that future results or events will be consistent with any such opinions, forecasts or projections, which represent only one possible outcome. Furthermore, such opinions, forecasts or projections are subject to certain risks, uncertainties and assumptions that have not been verified, and future actual results or events could differ materially. The value of, or income from, any investments referred to in this material may fluctuate and/or be affected by changes in exchange rates. All pricing is indicative as of the close of market for the securities discussed, unless otherwise stated. Past performance is not indicative of future results. Accordingly, investors may receive back less than originally invested. This material is not intended as an offer or solicitation for the purchase or sale of any financial instrument. The opinions and recommendations herein do not take into account individual client circumstances, objectives, or needs and are not intended as recommendations of particular securities, financial instruments or strategies to particular clients. The recipients of this material must make their own independent decisions regarding any securities or financial instruments mentioned herein and should seek advice from such independent financial, legal, tax or other adviser as they deem necessary. J.P. Morgan may trade as a principal on the basis of the Research Analysts’ views and research, and it may also engage in transactions for its own account or for its clients’ accounts in a manner inconsistent with the views taken in this material, and J.P. Morgan is under no obligation to ensure that such other communication is brought to the attention of any recipient of this material. Others within J.P. Morgan, including Strategists, Sales staff and other Research Analysts, may take views that are inconsistent with those taken in this material. Employees of J.P. Morgan not involved in the preparation of this material may have investments in the securities (or derivatives of such securities) mentioned in this material and may trade them in ways different from those discussed in this material. This material is not an advertisement for or marketing of any issuer, its products or services, or its securities in any jurisdiction.

“Other Disclosures” last revised November 12, 2022.

Copyright 2022 JPMorgan Chase & Co. All rights reserved. This material or any portion hereof may not be reprinted, sold or redistributed without the written consent of J.P. Morgan.

Completed 08 Dec 2022 01:19 AM EST

Disseminated 08 Dec 2022 01:19 AM EST