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Neobanks in emerging markets: a risk assessment

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Neobanks have risen as popular digital challengers to incumbent banks, especially in emerging markets (EMs) where the banking sector is often characterized by oligopolies. This article first estimates the value of Nubank and StoneCo in Brazil, two of the fastest-growing neobanks in Brazil. Normalizing revenue growth assumptions from their financial data, valuation models uncover that Nubank could be overvalued by about two times, whereas StoneCo could be undervalued by 80% of its fair value, as of March 19, 2024. This article then discusses firm-specific (high cumulative net operating losses, low long-term operating margins, high borrowing costs) and adherent macroeconomic (political uncertainty, foreign exchange risks, high equity risk premia) risks in EMs that explain the volatility in Nubank's and StoneCo's stock prices. These risks are instructive for understanding the challenges facing the business model of neobanks in EMs.

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Introduction

The past ten years have witnessed the creation and rising popularity of neobanks, digital platforms offering financial services directly to retail customers. Though banks in name, as the Federal Reserve of Kansas City points out, neobanks are not exactly banks nor even challenger banks, for they do not necessarily possess bank charters themselves (Bradford, 2020; Lu, 2017). This fact often forces neobanks to offer financial services to customers through relationships with existing financial institutions with bank charters. Neobanks thus constitute a turning point in the global financial services industry, threatening to uproot the traditional banking industry, especially in emerging markets (EMs) where oligopolies are more likely to be observed.

The 2008 Financial Crisis sent banks into fire sales that sparked a wave of cross-border merger and acquisitions (M&As). What resulted was an accelerated concentration in the banking industry in EMs, such as BBVA’s acquisition of Compass Bancshares (Beltratti and Stulz, 2012; Bikker and Haaf, 2002; Deidda and Fattouh, 2005). In fact, the value of cross-border M&As in EM banks tripled from US\$7.9 billion pre-Financial Crisis (2000 to 2006) to \$22 billion post-Financial Crisis (2007 to 2013), comprising around 19% of global M&As (Rao-Nicholson and Salaber, 2016).

This M&A trend gave rise to consolidation in the banking industry in EMs, most saliently in Latin America (Schapiro and Taylor, 2018). Focusing on the case of Brazil, the domestic banking industry is dominated by a mere five banks (two public and three private): Banco do Brasil and Caixa Economica Federal, commercial banks controlled by the government, and Banco Bradesco, Banco Itau, and Santander, which are private banks. Operating credit lines that reach across different but overlapping areas of the country, the five banks control around 92% of the credit market and credit operations (56% by Banco do Brazil and Caixa Economica Federal and 35.5% by Bradesco, Itau, and Santander, Capeleti et al. 2022), as well as 80% of the Brazilian banking and financial services market.

Yet, neobanks have enjoyed unparalleled growth worldwide. The global market of neobanks rose from US\$47.39 billion in 2021 to US\$66.82 billion in 2022 and is projected to grow at an annual rate of 53.4% to US\$2.05 trillion by 2030 (Statista Research Department, 2022a). Figure 1 traces the number of neobank user accounts worldwide from 2017 to 2027, rising from 18.95 million users in 2017 to 250.74 million users by 2023, and projected to rise to 376.89 million users by 2027.

The rise of neobanks thus threatens to uproot a decades-long oligopoly in EMs like Brazil. The question of whether the business model of neobanks is sustainable looms large, particularly as market volatility observed in the collapse of technology stocks in 2022, which includes aspirant neobanks, cast doubt on the sustainability of their revenues. Addressing this lacuna, this article

examines the cases of StoneCo and Nu Holdings or more commonly known as Nubank, the name of its banking enterprise, storied neobanks in Brazil backed by a roster of high-profile investors including Berkshire Hathaway, Sequoia, Tencent, and Tiger Global. Brazil is an ideal case with which to examine neobanks, given that four of the 13 largest neobanks in the world are based in Brazil, the largest share of any country and the largest of which is Nubank (Statista Research Department, 2022b).

At the time of its IPO on December 6, 2021, Nubank went public at \$9 and rose to \$11.85, before falling –62.11% to \$4.48 by March 10, 2023, then rising to \$11.85 by March 19, 2024 (Fig. 2). StoneCo followed a similar trajectory. Its closing price on the day of its IPO on October 22, 2018 was \$31.09, before a period of vicissitudes leading up to its decline to \$8.72 on March 10, 2023, then rising to \$16.27 as of March 19, 2024 (Fig. 3). Part of their volatility was related to market volatility. From 2018 to 2023, the return on the S&P was 96.9%, the Nasdaq returned about 131.2%, and the Bovespa Index returned about 48.7%. From 2021 to 2023, however, the return on the S&P was –18.98%, the Nasdaq returned –28.8%, and the Bovespa Index returned –1.15%. Nonetheless, if markets are efficient, the precipitous decline in Nubank that outpaced the three indices should reflect new information during this period that portend unsustainability in its business.

This article consists of several parts. First, DCF models are developed to estimate the value of Nubank and StoneCo, which are then compared their market prices. The valuations presented uncover that Nubank is still substantially overvalued even with lofty revenue expectations priced in, but StoneCo appears undervalued. This article then discusses firm-specific and domestic and global macroeconomic risks facing Nubank and StoneCo that are instructive for understanding the challenges facing neobanks in EMs as a whole.

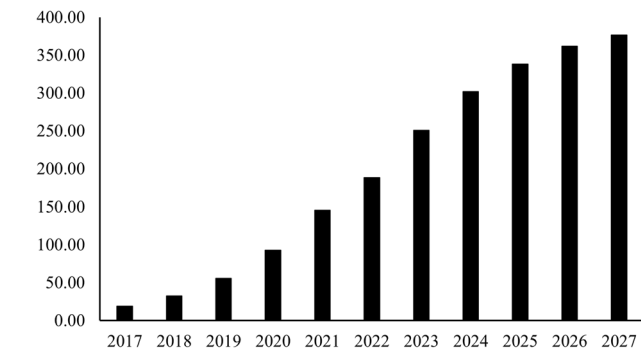


Fig. 1 Number of customer accounts at neobanks worldwide (in millions). Source: Author calculations using data from Statista (2023).

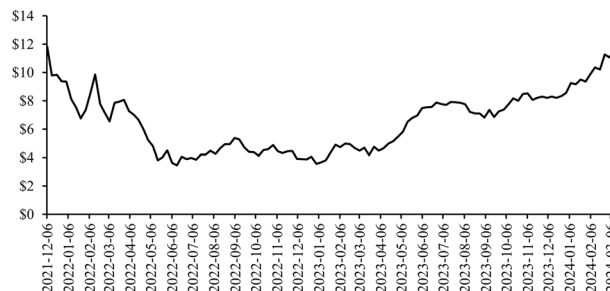


Fig. 2 Performance of Nubank’s stock on a weekly basis.

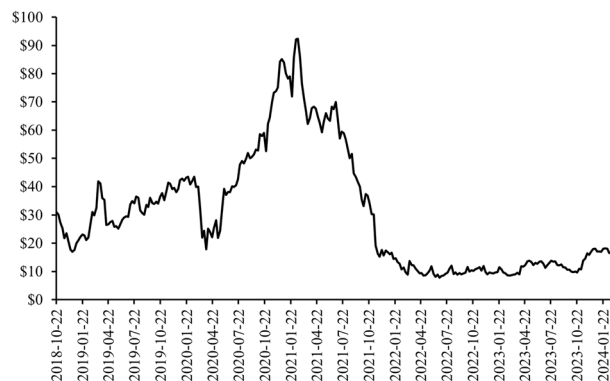


Fig. 3 Performance of StoneCo’s stock on a weekly basis.

Neobanks in the Brazilian context

Neobanks largely emerged in the early 2010s in the wake of the 2007–2009 Financial Crisis that saw about widespread mortgage defaults incurred by trading collateralized debt obligations (CDOs) and collateralized loan obligations (CLOs) by U.S. national banks. The ensuing financial destabilization of the global economy animated a general dissatisfaction with the existing monetary system that demands systematic, rather than piecemeal, reform.

There are several issues to banking access that neobanks seek to address.

The first has to do with trust. Much research has since found that trust in counterparties among banks, as well as in the financial system among citizens fell apart in economies worldwide (Crabtree, 2013; Guiso, 2010; Jansen et al. 2015; Knell and Stix, 2009; Poznyak et al. 2014; Roth, 2009; Sapienza and Zingales, 2015). Gallup Poll data on trust in institutions in the U.S. shows that confidence ratings in institutions (those who reported “a great deal” of confidence) fell from 40% pre-Financial Crisis to 32% in 2007, where it has languished till even 2021, and the same measure of confidence in banks has dropped from over 50% pre-Financial Crisis to 33% in 2021 (Brenan, 2021).

This was not merely an American phenomenon (Van der Crujssen et al. 2016). After the Financial Crisis, institutional trust fell drastically in EMs. According to the Inter-American Development Bank’s latest Trust Report on Latin America and the Caribbean (Keefer and Scartascini, 2022), trust in banks languishes at an average of 43%, and trust toward other kinds of private businesses stands at 40%.

Second, high fees. The oligopoly over the Brazilian banking, credit, and financial services market dominated by Banco do Brasil, Banco Itau, Banco Bradesco, Caixa Economica Federal, and Santander paved the way for high fees for banking customers. To illustrate, De Genaro et al. (2021) used a regression discontinuity design framework to find that higher capital requirements imposed by the Basel Committee on Banking Supervision (BCBS) on systemically important banks did not have an effect on Brazilian banks’ fee income, return on assets, or return on equity, because regulatory costs were simply passed on to customers by raising their fees and spread.

Third, banking access, even with the availability of contemporary mobile platforms. Another corollary of the Brazilian banking oligopoly has been significant constraints in financing accessible to households, especially in rural areas, as well as small and medium enterprises (SMEs), in part because banks have higher risk aversion and maintain a preference to extend loans to larger firms (Godke Veiga and McCahery, 2019).

Studies in Brazil have identified a low willingness among banks to make use of mobile devices to encourage banking transactions and banking adoption, as well as low spending on mobile platform development and educational and marketing campaigns to improve mobile-banking and therefore banking access (Malaquias and Silva, 2020). Numerous studies have further associated low mobile banking acceptance with households’ general distrust toward banks and their dissatisfaction with banks’ mobile platforms, which are seen as poorly developed and difficult to use, which has been associated with the large size of the unbanked population in Brazil (Malaquias and Hwang, 2016; Ramos et al, 2018; Sharma and Sharma, 2019).

Issues of banking access are not restricted to households, but extend to SMEs as well. Concentrating loan issuance toward large firms, banks have created a sizeable financing gap for SMEs, which face a narrowing set of external financing options, despite their importance for employment in Brazil, with estimates of the proportion of total employment occupied by SMEs ranging from

50 to 66% (Cravo et al. 2012; Cravo et al. 2015; Ferreira de Lara and Neves Guimarães, 2014).

Against this backdrop, neobanks entered the domestic market to capture market share by appealing to customers as a form of financial disintermediation from traditional banks and to offer solutions for this trinity of issues. Nubank is one of the most successful cases of a neobank. Headquartered in São Paulo, Brazil, Nubank was first created in 2013 by David Vélez, a former partner at Sequoia Capital, Edward Wible, and Cristina Junqueira from Itaú Unibanco.

Nubank offers digital checking accounts connected to an instant payment transfer system (Pix), a no-fee credit card (Nubank Mastercard), an investment trading platform with low minimum trading amounts, a new cryptocurrency trading platform (Polygon) and its own cryptocurrency token (Nucoin), insurance (Nubank Insurance), and personal loans.

Abetting the popularity of the credit and banking options offered by Nubank is the gamification of its platforms. To illustrate, the platform self-claims to offer a gamified experience to users in building their credit limit, which is accomplished by completing game-like “missions” that involve using other Nubank features such as its credit card and paying bills with its user bank account (Nu Holdings, 2022). Gamification, as Baptista and Oliveira (2017) find in a study of mobile banking users, makes banking activities “more exciting, more interesting and more enjoyable, and in turn increase[s] customer acceptance, engagement, and satisfaction” and ultimately mobile banking adoption (p.118).

Established in 2012 by Eduardo Pontes and Andre Street, StoneCo is also an e-commerce company based in Brazil that offers digital payments solutions for small and medium enterprises. In addition to its payments processing service, it has since branched out into accepting deposits and offering loans to merchants. At the end of 2023, StoneCo aggregated its many services into one platform called Stone Platform, in which it registered roughly 3.5 million active clients.

Methodology: the valuation models

This article presents a case study of neobanks using Nubank and StoneCo. The data for this study come from Nubank’s annual reports and quarterly earnings from Q3 of 2021 (when it went public) to Q4 of 2023, and StoneCo’s annual reports and quarterly earnings that covered Q3 of 2018 to Q4 of 2023. Though the data for some calculations are confined to this period, it deserves to be noted that other calculations have a range of financial data that extend farther back to Q3 of 2020 (revenue, income, and operating margins) because annual reports offer figures from a year prior as a basis of comparison.

This article uses Damodaran’s (2009, 2013; Cornell and Damodaran, 2014) valuation approach to value Nubank as a young growth company consisting of three primary inputs: (1) forecasted cash flow from existing assets, (2) expected growth, and (3) the discount rate that is essentially the cost of capital when valuing the business. These measures are operationalized in a three-step process to overcome estimation challenges by young companies (Damodaran, 2013): first, estimating a revenue growth rate, which is determined by “an estimate of the growth of the overall market in which the company operates in conjunction with an evaluation of the relative strengths and weaknesses of the company’s products and services”; second, forecasting a target operating margin to which Nubank will converge to over time; and third, estimating the investment required to achieve the forecast growth, derived by “examining changes in revenue from period to period and making judgments on how much additional capital will be required to provide for growth” (Cornell and Damodaran, 2014, p.7).

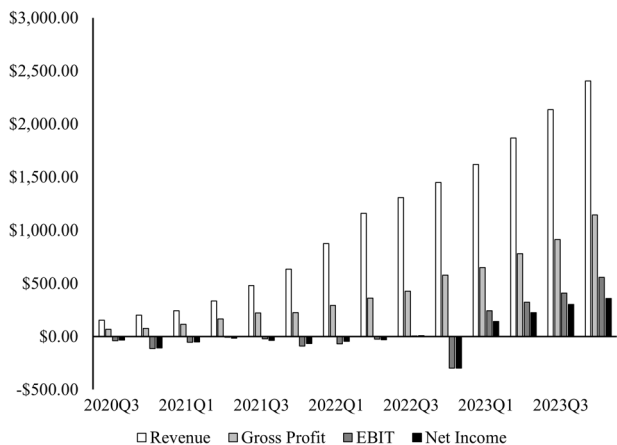


Fig. 4 Nubank's revenue and income over time (in US\$ millions).

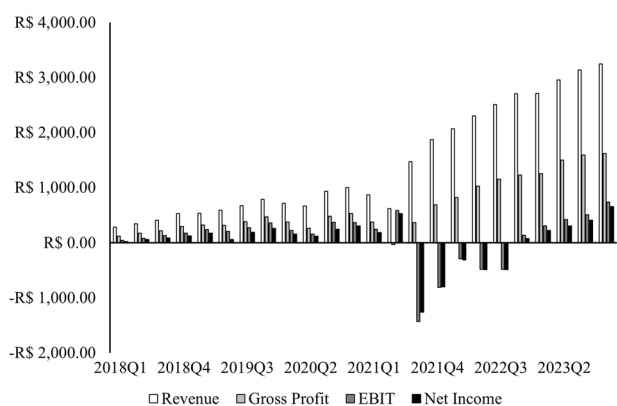


Fig. 5 StoneCo's revenue and income over time (in millions of R\$).

I first examine Nubank's quarterly revenue and earnings with as much historical data as possible, from Q3 of 2020 to Q4 of 2023 (Fig. 4). I do the same for StoneCo from Q1 of 2018 to Q4 of 2023 (Fig. 5). I measure earnings using three different measures: gross profit, earnings before interest and tax (EBIT), and net income.

The operating margins based on these three measures of earnings (gross margin, EBIT margin, and net profit margin) as a percentage of revenues each quarter are presented (Figs. 6 and 7). For Nubank, from Q4 of 2020 onward, margins gradually move from negative territory until reaching profitability in Q3 of 2022, before dipping back into a loss in Q4 of 2022. For StoneCo, operating margins experienced similar vicissitudes, falling from an average of 37.9% from Q1 of 2018 to Q2 of 2022 toward -97.16% in Q3 of 2021 and remaining negative through to Q4 of 2022, where it returned to profitability of just 5.15% operating income margins. Most recently, in 2023, operating margin improved to 22.72%.

To estimate the value of equity for Nubank (the value of the company minus the value of outstanding debt), one of my inputs is its value-to-sales ratio. A higher ratio means a higher valuation will be supported. I recognize that this value is variable and a part of the complexity of valuing new companies. What ratios are best for Nubank and StoneCo? Traditional banks in Brazil like Banco de Brasil have a value-to-sales ratio of about 0.2–0.3. Financial technology companies, however, report far higher ratios, such as Mercadolibre that has a ratio of 4.6. StoneCo had a ratio of about 2.77 and Nubank had a ratio of 2.53. I am uncertain that they will sustain such high ratios forever, but I note that it is in line with the ratio for financial technology companies (rather than banks), so I maintain this assumption in my models.

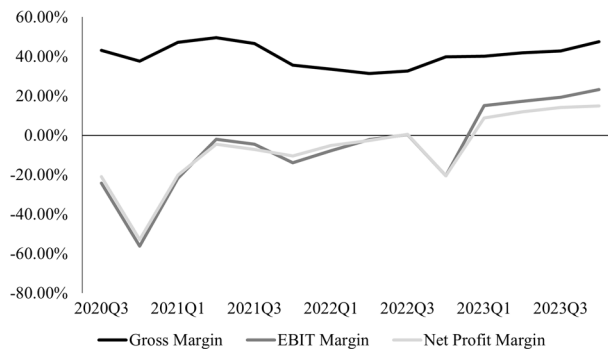


Fig. 6 Nubank's operating margins.

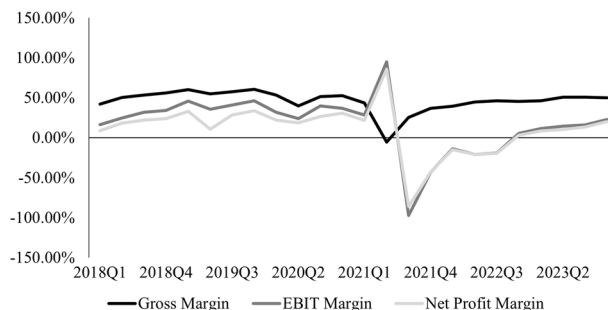


Fig. 7 StoneCo's operating margins.

Based on revenue growth rates of 67.5% in 2023, 182.2% in 2022, and roughly 211.36% in 2021 for Nubank, I assume a generous growth rate of 100% in the first three years, commensurate with the past few years, which then drops off to 30% in the next four, and finally 20% in the final three of my valuation period – culminating in an annual revenue growth rate of about 55% over the valuation period. For StoneCo, with more years of past data, we are better able to normalize their annual revenue growth based on a 5-year average of their past years, including 25% in 2023, 99% growth rate in 2022, 45% in 2021, 29% in 2020, and 34% in 2019. I arrive at an average growth rate of 46.4%, which is adopted in the model.

The process for valuing young companies is difficult. Damodaran (2009) stresses that lack of historical data on which to base valuation models and lack of revenue and operating losses are inescapable challenges for new businesses¹. I note that the concern underlying these challenges is that shifting macroeconomic conditions may jeopardize the sustainability of revenues, which is difficult to assess without historical data (Joos et al. 2016; Lui et al. 2012).

Adopting this approach acknowledges the contingency of valuation risk and risk forecasts on states or investor sentiment shifts based on changing macroeconomic conditions, namely, changing long-term bond rates as a proxy for shocks like rising inflation. I estimate my valuation based on Brazil's long-term yield of 10.91% (as of March 19, 2024), given that Nubank and StoneCo are primarily listed on the NYSE, but whose operations are both based in Latin America and headquartered in Brazil.

I lower my expectations of cost of capital in linear increments as we move forward in the second half of my forecasted growth period (Years 6 to 10), as Nubank's and StoneCo's systematic risk converge with that of mature financial institutions. I estimate an initial cost of capital of about 20.65%, before adjusting it upward to 41.87% in Year 6 toward 26.39% in Year 10 for Nubank. For StoneCo, which has more debt relative to cash, I estimate an initial cost of capital that moves from 28.25%, before adjusting it to around 27% through Years 6 to 10. The two present different

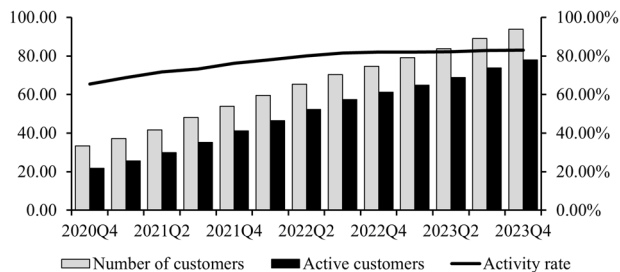


Fig. 8 Number of total and active Nubank customers (in millions) and activity rate.

models of growth. Varying costs of capital weigh on their valuations because, as a new company, Nubank relies more on equity than debt to fund its operations, whereas StoneCo appears to rely more on debt.

I am consistent in my company-specific risk assumptions for Nubank and StoneCo. The volatility for stock returns for both companies is high, reflected in a beta of 1.98 for Nubank and 2.35 for StoneCo that place them closer to young technology companies than banks, which I assume will move over time toward 1.5, closer to the average for financial services companies.

I additionally account for the fact that EMs like Brazil are riskier and should have higher costs of capital for companies than in the U.S. I thus estimate a market premium of 11.13% for Brazil by taking the local currency sovereign rating and estimate default spread for that given rating over the long-term government bond rate, which I add to the U.S. market premium (Damodaran, 2023). Though Nubank is entering other markets in the region like Colombia and Mexico, the majority of its customers are still based in Brazil, its home market. The financial services market in Brazil has a higher mean operating margin of about 10–13%, but I note that margins are likely to converge to lower levels with the rise of competition from new challengers, much like Nubank and StoneCo are challengers today. More specifically, I assume that Nubank and StoneCo will converge to operating margins of 15 and 16.09%, respectively, given their most recent performance in the past year of 2023.

Valuing Nubank and StoneCo. Valuing a company requires drawing on both financial information, firm-level policies, and industry-level trends, that are contextualized in macroeconomic developments. In what follows, I present a systematic overview of my valuation results and discuss the risks facing Nubank and StoneCo.

To begin with, I trace and observe a sizeable, sustained increase in the number of Nubank customers in absolute and relative terms in Fig. 8. The activity rate or the proportion of active (all customers who have generated revenue over the last 30 calendar days) to total customers has accordingly increased to about 81.53%. More saliently, total and active customers have risen from 33.3 million and 21.8 million from Q4 of 2020, to 48.1 million and 35.2 million by the time of Nubank’s IPO in Q3 of 2021, and finally to 93.9 million and 78 million in Q4 of 2023, respectively – across Brazil, Mexico, and Colombia. This amounts to about a 6.31 and 12.14% quarter-over-quarter increase in the numbers of total and active customers, respectively. While StoneCo does not offer activity rates, I can similarly visualize a substantial growth of users from 268,000 in 2018 to 774,000 during the pandemic in 2020, before rising further to about 3.5 million in 2023. This culminates in a 184.3% growth rate on average per annum (Fig. 9).

However, despite Nubank’s success in attracting new customers, the business itself appears to be significantly overvalued

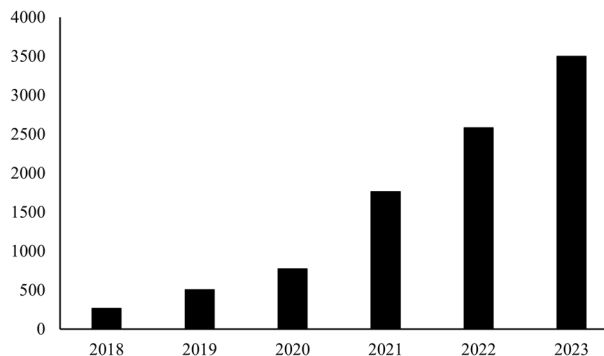


Fig. 9 Number of StoneCo users (in thousands).

Table 1 Summary of DCF Valuation Model for Nubank (in US \$ millions) and StoneCo (in R\$ millions) as of March 19, 2024.		
	Nubank	StoneCo
Trailing 12-Month Revenues	\$8,029.04	R\$12,055.1
Trailing 12-month Operating Income	\$1,539.02	R\$1,970.8
Operating Margin	18.72%	16.09%
Return on Capital (in Year 10)	44.81%	50.57%
Cost of Capital	23.59%	24.97%
Cost of Capital (perpetuity)	26.01%	8.08%
Value of Equity	\$20,408	R\$20,205
Estimated Value of Equity per Share	\$5.7	R\$387.08
Price per share	\$11.85	R\$81.86

(Table 1). Trading at a price of \$11.85 as of March 19, 2024, Nubank appears to be overvalued based on my estimated value per share of \$5.7, even under liberal assumptions of growth of 55% per annum for the next ten years. More specifically, a stock price of \$11.85 assumes that Nubank’s revenue will grow at an annual rate of about 68.25% over the next ten years. StoneCo, however, appears to be undervalued under my revenue growth assumptions. A stock price of R\$81.86 or \$16.27 for StoneCo implies a growth rate of 57% over the next ten years, but my assumptions of 30% annual growth rate suggests a fair value of roughly R\$133.28.

Challenges for Neobanks: firm-specific and macroeconomic risks.

This section discusses several firm-specific issues identified in the process of my valuation as well as macroeconomic developments to reconcile the volatility witnessed of Nubank and StoneCo that are instructive for understanding the future of neobanks, especially in EMs like Brazil.

- (1) **Cumulative net operating losses (NOL).** Though Nubank became profitable in Q3 of 2022, it was unclear at the time whether this would persist given the limited data. Initially, we observed that this appears to have been short-lived, given that the company returned to generate a loss the following quarter in Q4 of 2022. The company was quick to note that this was due to a one-time loss of US\$356 million due to the CEO’s decision to terminate the 2021 Contingent Share Award, which purportedly resulted in the expense because the vesting of the share award was accelerated. At the time, I noted that this expense added to a NOL of at least US\$669.66 million (including the US\$356 million loss from Q4 of 2022) carried forward from Q3 of 2020 through to Q4 of 2022 alone. A company’s cash flows need not only grow, but must grow sufficiently in later years to cover losses from earlier ones. Consistent quarters of profitability

in 2023 appear to have since erased the NOL, prior to which we forecast that point at which its EBIT-covered NOL would have required five years. Similar to Nubank, StoneCo has successfully offset several quarters of NOL from Q3 of 2021 to Q3 of 2022 by other years of profitability.

However, I stress that Nubank has only had one year of profitability, prior to which it consistently lost money and had an average operating margin of -14.36% from 2020 through 2022. This is far more volatile than that of the top five banks in Brazil, like 13% at Banco do Brasil, 10% at Itau, or 22% at Santander.

The looming shadow of NOL is made more difficult to overcome by unstable operating margins that are in part because of the very ingredient for Nubank's success in user growth, namely, its target population: the domestic unbanked population. Nubank is largely targeting an unbanked population of about 134 million adults in Brazil, Mexico, and Colombia, where there is also low credit card adoption (27 , 9.5 , and 13.9% , respectively), low household debt as a percentage of GDP (30.5 , 16.2 and 27.6% , respectively), low credit and debit purchase volume as a proportion of household consumption (40 , 24 , and 15% respectively). In all categories, rates nearly two or three times higher in the U.S. and U.K. are used by Nubank as benchmarks for comparison to suggest a two-to-three-times penetration opportunity for its products. However, this gap is difficult to close on account of the low-income that Nubank's target unbanked populations represent. Even if it was closed, operating margins run the risk of lowering compared to incumbent banks.

Though StoneCo appears safer than Nubank on this score by targeting merchants instead of customers, its operating margins remain volatile and difficult to normalize. Despite consistent profitability, the fall to losses from Q3 of 2021 to Q3 of 2022 (down to a staggering operating margin of -85.75% in Q3 of 2021) reveals the vulnerability to macroeconomic distress and the instability of its revenue base (namely, its merchant customers) similar to Nubank's. Losses observed at Nubank and StoneCo appear connected to spikes in interest rates that increased their funding costs, particularly for their prepayment businesses. Moreover, they were unable to pass along higher costs to consumers immediately, due to the fact that their customer base is more financially precarious, being resident in an EM. The steep drops in profitability for both companies not only unveil neobanks' sensitivity to interest rates, but also their inability to react quickly and their lack of pricing power due to the nature of their EM operating environment.

- (2) High cost of debt. EMs differ from advanced economies on account of five institutional features: "weak fiscal institutions, weak financial institutions including government prudential regulation and supervision, low credibility of monetary institutions, currency substitution and liability dollarization, and vulnerability to sudden stops (of capital inflows)" (Mishkin, 2004, p.3; see also Favero and Giavazzi, 2002). These weaknesses in EM fiscal, financial, and monetary institutions render EMs especially vulnerable to inflation and currency crises. As a result, Treasury yields are typically high, raising the cost of debt. In Nubank's case, the interest on its debt is around 12% , in line with the average yield for Brazil's 10-year Treasury bonds during 2006 to 2023.

StoneCo has a disadvantage compared to Nubank. StoneCo carries R\$4.575 billion of debt relative to cash and cash equivalents of R\$1.512 billion and current non-cash

working capital of R\$3.972 billion. Nubank carries \$1.174 billion of debt, relative to \$5.923 billion of cash and cash equivalents. At a roughly 12% cost of borrowing based on the 10-year Treasury yield and Beta of 2.37, the market value of StoneCo's debt amounts to R\$16,531.39, while that of Nubank amounts to \$9.272 billion (based on a Beta of 1.97). Higher costs of debt thus lead to higher interest expenses that destabilize revenue over time.

- (3) Domestically, political uncertainty looms large. Though policies have been promised by governments in the region to foster innovation and increase competition in the financial services sector, we note a regime change in late 2022, when liberal Luiz Inácio Lula da Silva was elected President of Brazil. Lula's election platform and proposed reforms center on greater state intervention in market reforms that mirror his first term. The same macroeconomic concerns buried in his platform thus rise to the fore: exchange rate appreciation and public spending. On first glance, it appears that much like Lula da Silva's first term, priorities of the economic policies in his present term will likely be disinflation and income transfers to the poor. Also like his first term, this will mean higher taxes and high real interest rates, which will require a larger government budget surplus before net interest payments to keep public debt manageable (Amorim, 2010; Barbosa-Filho, 2008; Bianchi and Braga, 2005). This, in turn, may invite depreciation of the Brazilian Real that lowers the nominal value of Nubank's figures (that are reported in US\$, per NYSE rules). In April 2023, the Central Bank of Brazil placed a cap on interchange fees charged to 0.7% for prepaid cards. Though this does not affect debit cards and credit cards that are the core of Nubank's revenue nor payments-processing for StoneCo, the possibility of expanding price caps on interchange fees for broader financial products places their revenues at risk. Interest rate cuts, like Brazil's recent cut to its key interest rate to 11.25% in January 2024, may also decrease loan revenues among neobanks (offsetting any potential benefits from lower costs of borrowing).
- (4) Exchange rates pose multiplex risks to neobanks in EMs. Given that the U.S. Dollar has appreciated relative to the Brazilian Real from 2011 (1 USD: 1.56 BRL) to March 2024 (1 USD: 5 BRL), exchange rates also directly lower company earnings when they report earnings in U.S. Dollars (in addition to Brazilian Reals), required for companies listed in the U.S. More indirectly, exchange rates pass through to domestic inflation in a non-linear fashion (Bogdanski et al. 2000), which once more prompts volatile key interest rate increases.

There initially appear to be countervailing factors that might mitigate the effect of exchange-rate appreciation on the Brazilian economy at large, such as trade with China that may reduce the effect of exchange-rate appreciation on Brazil's exports by increasing global demand. Should commodity prices continue to rise, this may bolster the value of Brazilian exports given that much of Brazil's tradable goods are natural resources and basic products, also reducing the effect of exchange-rate appreciation.

However, this dependence on China faces risks of its own, in light of a slowdown in Chinese construction. China is one of the largest importers of Brazilian commodities (such as iron ore), making its troubled real estate sector a key driver of growth for the Brazilian economy. China faces its own issues of over-investment and mounting debt that increasingly require policy pivots from subsidizing the construction and manufacturing sectors toward increasing household consumption as a

proportion of its GDP (Au, 2024; Pettis, 2019). The ongoing slowdown in Chinese construction has thus precipitated declines in iron ore prices closer to pre-pandemic levels, casting doubt on the growth prospects of the Brazilian economy at large. These uncertainties raise the equity risk premium that the market expects of Brazilian companies, which ultimately lowers investors' risk tolerance for neobanks like Nubank and StoneCo.

Conclusion

Financial services in Brazil have been ripe for disruption, given their expensive fees, lack of alternatives, and expensive credit for consumers that are permitted by an oligopoly of banks (Zeidan, 2020). Neobanks have risen to the challenge over the past several years, tapping into the unbanked populations and seizing market share from incumbent banks.

This article has examined the sustainability of neobanks' business model through the example of Nubank and StoneCo, two of the fastest-growing neobanks in EMs. Though no direct measure of consumer trust is available to cross-compare (mis) trust in Nubank and StoneCo versus the Brazilian incumbent banks that they seek to disrupt, the growth in customer and SME accounts at both firms serve as an adequate proxy with which to infer a remarkable degree of success at earning trust.

However, the same population that neobanks can most ably target – unbanked and low-income households – are exactly those that lead to lower and more volatile operating margins compared to the margins observed at incumbent banks, even with the wide range of products that Nubank and StoneCo have to cross-sell. While StoneCo has superior operating margins, owing to its targeting of SMEs that are slightly more stable than low-income households, it nonetheless experiences significant volatility in its operating margins. More importantly, political economic uncertainty has added to the volatility of interest rates, which can significantly increase costs of funding that leads to steep losses. For neobanks, which often finance themselves through equity more than debt, this volatility adds to the difficulty of compensating a typically sizeable NOL carried forward from previous years, especially amid recessionary and currency crisis concerns in EMs.

Product verticalization and cross-selling are important strategies that neobanks have to expand, but in EMs, disproportionately larger low-income populations constrain neobanks' pricing power and their ability to pass through costs to customers during volatile changes in interest rates like those witnessed in 2021. Policy revisions in EMs like Brazil, which better represent a model of state capitalism than liberal market capitalism, may introduce pricing caps that further jeopardize the take rates neobanks charge their consumers. As a result, operating in EMs mean elevating the equity risk premium that markets expect of neobanks and increasing their costs of borrowing.

Data availability

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

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Note

1 Another caveat is that new businesses have a low survival rate. The mean survival rate of new businesses craters from 81% to roughly 31% by the seventh year among all firms across sectors (Knaup & Piazza, 2007). Some variation has since been parsed out in regional terms, such as rural-based businesses outlasting urban-based businesses by a larger margin (Deller & Conroy, 2016) and nations with lower tax rates and more

favorable regulations (Falck, 2007; Puca, 2020). But we follow Damodaran's (2014) approach in outlining that survival is ill-suited for inclusion in expected cash flows. Given that Nubank reports 70 million customers, we also keep with an optimistic approach and assume that the risk of failure is zero.

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Author contributions

AA was responsible for conceptualization, financial modelling, other analysis, and writing.

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The author declares no competing interests.

Ethical approval

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Informed consent

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