Corporate & Investment Banks

Striving to Sustain Returns

Wholesale Banking’s impressive returns reflect a decade of repositioning in Markets and IBD. We think improved returns are sustainable. A constructive macro and policy environment is just one driver. To lift returns even higher, unlock the value of Transaction Banking with a shift to recurring fees, services-based business models, and enhanced disclosure.
Authors

**MORGAN STANLEY**

Betsy Graseck, CFA¹
EQUITY ANALYST
+1 212 761 8473
Betsy.Graseck@morganstanley.com

Magdalena Stoklosa, CFA²
EQUITY ANALYST
+44 20 7425 3933
Magdalena.Stoklosa@morganstanley.com

Nick Lord³
EQUITY ANALYST
+65 6834 6746
Nick.Lord@morganstanley.com

Ken Zerbe, CFA¹
EQUITY ANALYST
+1 212 761 7417
Ken.Zerbe@morganstanley.com

Izabel Dobreva²
EQUITY ANALYST
+44 20 7677 5006
Izabel.Dobreva@morganstanley.com

Giulia Miotto, CFA²
EQUITY ANALYST
+44 20 7425 5344
Giulia.Aurora.Miotto@morganstanley.com

Ryan Kenny¹
EQUITY ANALYST
+1 212 761 1664
Ryan.Kenny@morganstanley.com

Vishal Shah²
RESEARCH ASSOCIATE
+44 20 7677 2743
Vishal.Shah6@morganstanley.com

**OLIVER WYMAN**

Ronan O’Kelly
PARTNER
+44 20 7852 7875
Ronan.OKelly@oliverwyman.com

Mariya Rosberg
PARTNER
+1 646 364 8448
Mariya.Rosberg@oliverwyman.com

Dylan Walsh
PARTNER
+1 646 364 8676
Dylan.Walsh@oliverwyman.com

James Davis
PARTNER
James.Davis@oliverwyman.com
+44 20 7852 7631

Nikunj Khutti
PRINCIPAL
+1 646 364 8757
Nikunj.Khutti@oliverwyman.com

Alex Becker
PRINCIPAL
+1 646 364 8530
Alex.Becker@oliverwyman.com

Milli Karlstrom
ENGAGEMENT MANAGER
+44 20 7852 8350
Milli.Karlstrom@oliverwyman.com

+1 Morgan Stanley & Co. LLC
+2 Morgan Stanley & Co. International plc
+3 Morgan Stanley Asia (Singapore) Pte.

¹ = Analysts employed by non-U.S. affiliates are not registered with FINRA, may not be associated persons of the member and may not be subject to NASD/NYSE restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account.
MORGAN STANLEY CONTRIBUTORS

Fred Brennan
RESEARCH ASSOCIATE
Frederick.Brennan@morganstanley.com

Brad Fitter, CPA
RESEARCH ASSOCIATE
Brad.Fitter@morganstanley.com

Tyler Gering
RESEARCH ASSOCIATE
Tyler.Gering@morganstanley.com

Manan Gosalia
EQUITY ANALYST
Manan.Gosalia@morganstanley.com

Mia Nagasaka
EQUITY ANALYST
Mia.Nagasaka@morganstanleymufg.com

Alvaro Serrano
EQUITY ANALYST
Alvaro.Serrano@morganstanley.com

Nida Siddiqi
EQUITY ANALYST
Nida.Iqbal.Siddiqi@morganstanley.com

Brian Wilczynski, CFA
RESEARCH ASSOCIATE
Brian.Wilczynski@morganstanley.com

OLIVER WYMAN CONTRIBUTORS

Jason Ekberg
PARTNER
Jason.Ekberg@oliverwyman.com

Daniela Peterhoff
PARTNER
Daniela.Peterhoff@oliverwyman.com

Chris Allchin
PARTNER
Chris.Allchin@oliverwyman.com

Patrick Hunt
PARTNER
Patrick.Hunt@oliverwyman.com

Christian Edelmann
PARTNER
Christian.Edelmann@oliverwyman.com

Elizabeth Costa
PARTNER
Elizabeth.Costa@oliverwyman.com

Tony Hayes
PARTNER
Tony.Hayes@oliverwyman.com

Robert Mau
PARTNER
Robert.Mau@oliverwyman.com

Ross Hibberd
Ross.Hibberd@oliverwyman.com

Ford Beazley
Ford.Beazley@oliverwyman.com

+ = Analysts employed by non-U.S. affiliates are not registered with FINRA, may not be associated persons of the member and may not be subject to NASD/NYSE restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account.
Contents

5 Executive Summary
8 Value Upside Across Wholesale Banking
13 Double Down on Transaction Banking
27 Value Growth in Restructured Markets and IBD
30 Scale and Innovation Drive Leaders and Laggards
Executive Summary

Wholesale banks are delivering high returns. A decade of structural changes in the Markets and IBD businesses has led to more efficient balance sheet use and volatility capture, laying the groundwork for a resilient performance in the pandemic. We think improved 12%-15% returns are sustainable given a positive macro and policy environment – a differentiated view as most investors have priced in a normalization of returns down to 10%. We see room to go even higher and unlock hidden value through a shift in focus to Transaction Banking – and particularly the high growth payments segment. To unleash growth, focus on recurring fees in the core business and shift towards services-based models. Act quickly to fend off disruption.

Sustainably higher returns for CIBs, but with a shift in focus to Transaction Banking. Wholesale banking businesses demonstrated resilience in the pandemic, delivering the best year in a decade with revenues up 7% YoY and return on equity (ROE) of 12%. The benefits of a diversified model were clear as Markets and IBD franchises grew by 26% last year, benefiting from structural changes that have reduced dependency on balance sheet and asset prices. These gains more than offset weaknesses in rate-sensitive businesses. While policy during the pandemic helped, 2020 returns are sustainable in our view. First, the macro backdrop is constructive with 7-10% Nominal GDP growth in 2021-22, and the expectation of a stable regulatory environment after a decade of reform. Second, banks can push even higher by unlocking hidden value in Transaction Banking. The fundamentals of this business remain strong, delivering through the cycle ROE of 30-45%. Yet there has been a vast transfer of value to non-bank players in this space over the past 3 years, with payments specialists like Adyen and Square gaining over >$1TN of market capitalization as banks have lost >$1TN. Non-bank business models have significant advantages, but the structural differences between wholesale businesses and other players do not warrant this gulf in valuation. Banks can narrow the value gap, and reassert their current leading position in the midst of market disruption, by doubling down on Transaction Banking.

CIB industry ROEs of ~12% in our central case. Without the volatility and policy boost of 2020, wholesale revenues will decline. Yet we expect revenues to remain in range or above 2017-2019 levels in all but our downside scenario, with a constructive macro and policy outlook and upside potential in the Transaction Banking business. The industry cost outlook is positive: discipline (especially on compensation) across leading banks has stabilized the cost base. European banks continue to lag leaders on profitability, but most are midway through significant cost restructuring programs that will continue to bring industry cost ratios down. We estimate a range of through-the-cycle ROE of 8-13% across our three scenarios, with returns improved from the pre-pandemic range of 9-10% in all but our most pessimistic scenario. With this growth outlook in mind, we see value upside for CIBs.

Narrowing the valuation gulf with non-banks. Wholesale banking businesses get a lower multiple from investors than adjacent non-bank players, who enjoy average P/E multiples double or quadruple that of global banks. A large part of this valuation gap can be explained by how these firms are assessed – with non-banks valued for fast revenue growth while banks are valued for earnings and returns – and by the regulatory capital requirements that impact banks. Nevertheless, we think there are steps management teams can take to narrow the gap. Together these actions are equivalent to 15% or >$200BN of market capitalization for the largest banks:

- Better disclosure now on Transaction Banking. Investors have not rewarded banks for the strong fundamentals of this business. Transaction Banking offers stable revenues, sticky client relationships, a source of funding for the bank and a clear link to the real economy. We think more transparency in reporting can drive average valuation uplifts of 8% (up to 20% for some Global banks).
- Actions to drive sustainable returns over the longer term. The market is missing the fundamental value and outlook for the wholesale business model: we project sustainably higher industry returns whereas current market valuations imply that returns will revert to pre-pandemic levels. Credible actions throughout the cycle to sustain 2020-level returns can drive average valuation uplift of 7%.
- C-Suite strategies to sustain returns. We see at least four levers management teams can pull to drive sustainable returns and narrow the value gap:
  - Maintain investment in scale while managing risks in Markets and IBD. The last five years have reinforced the earnings power of first-tier Markets and IBD businesses, as the model has shifted away from risk warehousing and towards less capital-intensive activities. While there will always be risk in the business and exposure to losses from idiosyncratic events, the dynamics of the business have changed consider-
ably as a result of post-Global Financial Crisis reforms. We estimate that a dollar of revenue now uses 21% less balance sheet and attracts 34% less VaR than 10 years ago. This structural shift was evident in the strength of these businesses during the heightened volatility of 2020 – although banks also benefited from the extraordinary policy response to shore up credit markets. Yet we continue to see a valuation gap relative to non-banks in this space, driven primarily by the high level of capital these businesses must hold relative to their risk. Banks that can successfully emphasize the value of network effects, countercyclical revenues, and reduced exposure to asset prices should be able to escape the valuation trap. Sustainable revenue upside will be driven by those that can maintain their investment in scale, while also efficiently allocating capital toward growth areas like electronic trading, private markets, ESG and digital assets.

- **Optimize Transaction Banking to recoup losses of 2020.** The sharp downturn in interest rates in 2020 led to a collapse of Net Interest Income on deposits, and effectively wiped out growth from the prior three years with $12BN in lost revenues. These lost revenues can be recouped over the next cycle through optimization of the existing business – reorienting the commercial model toward recurring fee income, increasing discipline in liability management and deposit pricing, and strengthening cross-selling. Management teams who move quickly will grow now while preserving an option on the significant upside from a macro recovery when rates rise later in the cycle, when banks should see a 15-20bps increase in Net Interest Margin – equating to ~$4BN of revenues for global banks – for each 100bps increase in interest rates.

- **Position to capture >$400BN from services-based models.** Leading banks are shifting from transactional to services-based models through the development of Banking as a Service (BaaS) offerings, business to consumer (B2C) and consumer to business (C2B) initiatives, and deep sector ecosystems. These longer-term value creation plays address changing client expectations and needs, adapt to the growing ecosystem of financial service providers, and target the areas of greatest payments growth. In many instances, such offerings target clients and require capabilities that are typically outside the Transaction Bank perimeter – requiring banks to look beyond traditional wholesale models and manage across internal silos and/or work with partner networks. The optimal participation strategies for individual banks will vary based on the starting point, but banks can either play for scale or focus on deep specialization. Those who succeed can bolster the value of the wholesale model and defend against disintermediation over the next 5-10 years.

- **Integrate embedded payments assets.** The past decade has seen substantial value creation in the payments ecosystem, but banks have largely missed out on this growth to date. Non-bank payments providers have benefited from exposure to high growth (and capital light) payments business, and high levels of investment into capabilities necessary to serve client needs. But even as non-banks become more competitive, banks have valuable payments assets that exist across the group: many banks have legacy merchant services businesses and scale payments processing factories, and most have extensive wholesale and retail customer networks and rich customer data. But few are maximizing the shareholder value of these assets by managing across silos. We argue that banks should “use or lose” these assets – by either better integrating to drive growth and scale or divesting.

**No time to waste as competitive pressures build in Transaction Banking.** Transaction Banking is attracting investments from a wide range of new entrants – including both banks and non-banks – who are gaining share with lower costs thanks to API-driven platforms built on the cloud. The payments space has a rich $1.4TN total addressable market (TAM) across wholesale and retail, of which non-banks have picked up ~20% market share in the last 3-5 years as plug-and-play FinTechs have entered across the value chain. In some cases, new entrants are complementing and enriching bank offerings – but the risk of disintermediation for banks is high, and non-bank activity has already contributed to a ~20% decline in banks’ fee margins over the last 4 years. These trends are poised to accelerate as the pace of digitization increases, spurred on by the Covid pandemic. Regulatory barriers are also falling, enabling non-banks to expand into areas previously off-limits such as deposit-taking businesses. Central Bank Digital Currencies (CBDCs) risk further disintermediating banks, though adoption is still in the early stages, and the direction in which CBDCs will develop is far from clear. Banks that prioritize Transaction Banking now are best positioned to fend off these threats.
Scale, geography, and innovation remain critical to winning models. We continue to see scale and geography driving significant advantages. The profitability gap between first-tier US (<60% CIR) and European (>70% CIR) banks was again significant in 2020, reflecting the benefits of scale and a more favourable macro environment for US banks. In Markets and IBD, the shift away from risk-intensive business models has increased the value of scale in liquidity provision and client service. In Transaction Banking, the negative interest rate environment exacerbates differences between European and US players, and the high fixed cost of the infrastructure poses challenges for smaller banks. We estimate a wholesale ROE gap of 6% pts between leaders and laggards over the cycle.

Nevertheless, we see opportunities for specialists and those that can innovate successfully across the wholesale landscape. In Markets and IBD, smaller players can manufacture scale through alternative strategies and by using open platforms to serve clients through partnerships to deliver core technology, product and even customer distribution. In Transaction Banking, smaller players that have begun to develop services-based offerings and/or outsource legacy technology can still be competitive. Across all parts of the business, banks that can successfully allocate and monitor investment dollars – and shift the culture of the bank to support innovation and cross-business collaboration – will continue to have a significant advantage.
Value Upside Across Wholesale Banking

Wholesale banks look undervalued vs. non-banks. Investors questioned how banks would weather the pandemic-induced shock to the real economy, with the dual banking headwinds of ultra-low interest rates and rising credit costs. Wholesale banks responded with their best year in a decade, delivering 7% growth YoY as capital markets businesses provided a counter-cyclical buffer against activities more closely linked to the real economy, helped significantly by central banks underwriting the credit market. Yet valuations dropped 22% for the industry. Over the past 3 years, the valuation gap between non-banking businesses adjacent to both Transaction Banking and Markets & IBD has widened. Market cap growth has declined in CIB businesses while increasing 70-120% in non-bank firms, which now enjoy average P/E multiples double or quadruple that of Global banks. While non-banks have significant structural advantages built around capital light, agile business models and are often valued for their faster revenue growth, in our view these differences do not explain the full valuation gulf between banks and non-banks. Investors have undervalued the resilience of the diversified CIB business model and potential for upside in a constructive macro and regulatory environment, the strong fundamentals and latent value of the Transaction Banking business, and the structural reforms and counter-cyclical benefits of the Markets and IBD businesses over the last five years. We argue that banks can and should focus on transparency and growth to unlock latent value and narrow the valuation gap.

Diversified CIB business model is undervalued. Transactional flow businesses (Transaction Banking and Securities Services) were the engine of CIB growth over the years preceding the pandemic, offsetting ~55% of the decline in revenues from other parts of the CIB business between 2016 and 2019. However, there was a sharp reversal in 2020: transactional flow revenues plummeted with the steep decline in interest rates and economic activity, while Markets and IBD businesses benefited from the spike in market volatility, strong client demand for liquidity, financing and broad fiscal and monetary stimulus. Broad-based CIB business models have benefited from exposure to both sets of businesses over the past cycle.

Exhibit 1:
Financial services valuation change ($BN)
Top 10 firms by market cap, 2017 vs 2020

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2020</th>
<th>P/E ratio change 2017 vs. 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global banks</td>
<td>~1,520</td>
<td>~1,272</td>
<td>-16% 13x 12x</td>
</tr>
<tr>
<td>Non-bank payments</td>
<td>~749</td>
<td>~1,654</td>
<td>121% 27x 48x</td>
</tr>
<tr>
<td>Non-bank capital</td>
<td>~261</td>
<td>~446</td>
<td>71% 24x 29x</td>
</tr>
<tr>
<td>markets firms</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Exhibit 2:
Transactional flows have been a growth engine of the wholesale banking business, offsetting the broader decline in CIB revenues from ’16–’19

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markets²</td>
<td>77</td>
<td>45</td>
<td>82</td>
<td>82</td>
</tr>
<tr>
<td>Securities Services</td>
<td>94</td>
<td>101</td>
<td>92</td>
<td>88</td>
</tr>
<tr>
<td>IBD</td>
<td>135</td>
<td>161</td>
<td>136</td>
<td>125</td>
</tr>
<tr>
<td>Lending</td>
<td>524</td>
<td>529</td>
<td>562</td>
<td></td>
</tr>
</tbody>
</table>

1. Revenue volatility is the standard deviation of the revenue growth rates from 2010–2020. 2. Includes Macro, Credit and Equities. Source: Coalition proprietary data, Oliver Wyman analysis.
There is a disconnect between valuations of Transaction Banking businesses inside banks and outside banks. Transaction Banking (defined here as payments and cash management, and trade finance) has strong fundamentals that compare favorably to other CIB businesses, delivering through the cycle ROE of 30-45%. The business also delivers stable revenues and earnings given client stickiness, and is a critical source of reliable low-cost funding. Yet disclosure on the economic value and performance of this business is limited, generally captured within the full perimeter of CIB or within broader corporate banking businesses — incorporating a significant drag from the Wholesale Lending balance sheet. This drives a “conglomerate discount” for the business — contributing a lower perception of value for Transaction Banking businesses within banks than for comparable businesses outside of banks. Meanwhile, the past decade has seen substantial value creation in the broader payments ecosystem, driving up the valuation of adjacent businesses outside of Wholesale banks. The market capitalization of the top 10 largest non-bank payments players are now worth ~$400M more than the top 10 banks, as the market values non-banks on revenue growth while valuing banks on earnings. This translates into non-banks generating a PE that is ~35x higher than banks.

Investors have not recognized the extent of structural reforms and resilience in Markets and IBD. Trading losses were far smaller in the pandemic-driven recession than they were in the Global Financial Crisis, in part due to the structural shifts that banks have undertaken in the last decade. Markets and IBD businesses have transformed their business models, reducing their exposure to asset prices while investing in the capabilities and infrastructure required to provide liquidity and financing (and generate steady revenues) in all market conditions. Yet investors are still valuing these businesses as primarily risk warehousing activities.

Growth upside is significant with expected resilience in returns. The valuation disconnect is particularly notable when considering the strong 2020 performance and positive growth outlook for the industry. We estimate in our central case that returns will be sustainably higher than the 2017-2019 average — and even at the low end of our projections, we expect returns to be within range of the pre-pandemic period average. We have defined three scenarios for CIB revenues over the next 3 years (described at the end of this section), and in each of these Markets and IBD soften, while Wholesale Lending and Transaction Banking slowly recover from sharper drops in 2020, supported by the positive outlook for the real economy. At the same time, leading banks have undertaken the difficult work to restructure their cost bases, and others are in the midst of significant programs, supporting a positive outlook on costs.

Our central case projects CIB ROE of ~12% by 2023, which is 2-3% pts above the 2017-2019 average. We see three components to this:

• Markets and IBD revenue will rebalance after the large swings seen through the peak of the pandemic driving a ~1-2% pts decline in ROE from the highs of 2020; however, favorable macroeconomic conditions, cost restructuring and balance sheet discipline in these businesses will sustain revenues and returns at higher levels than pre pandemic rates.

• Global banks will continue to release provisions built up during the initial economic shock of 2020, adding ~1% pt to ROE, with the upside skewed towards US banks who were more aggressive than their European counterparts in provisioning early in 2020.

• Leaders have an opportunity to outperform by doubling down on Transaction Banking, pulling multiple commercial levers to capture recurring fee income and optimize the use of the balance sheet. This will add 1% pt to ROE industry wide, with a sizeable gap between the leaders and laggards.

In the medium to long term we see three bold plays on Transaction Banking through which a further >$400BN revenues and returns upside can be captured, with these also extending outside of the wholesale CIB perimeter and into other areas of the bank. By capturing this opportunity, banks can also make the case for higher valuation multiples as their earnings becoming increasingly geared to high growth, low capital, fee-based businesses.
Narrowing the value gap. We believe there are actions banks can take to narrow the valuation mismatch with non-banks through better disclosure and a focus on the growth potential of the Transaction Banking business. These actions are equivalent to 15% or >$200BN of market capitalization for the largest banks:

- **8% valuation upside from better disclosure alone.** Despite strong fundamentals in Transaction Banking, disclosure is limited, and the true economic value of the franchise is disguised. We estimate incremental valuation upside from better disclosure to highlight the strong fundamentals of Transaction Banking economics. This could increase valuations by ~8% on average and >20% for some banks, equivalent to >$100BN in market capitalization for the largest banks, even accounting for the impact of the lending book that underpins Transaction Banking. For example, banks can provide more granular insight into specific businesses (e.g. the revenues, costs, RWAs for Payments and Cash Management (PCM), Trade and Lending), a breakdown of PCM revenues into interest income and fees, payments volumes, and more insight into Treasury loans and deposits. Greater disclosure will be a double-edged sword, as the enhanced scrutiny will push management teams to further optimize on the pricing, growth and balance sheet efficiency of the business, however, it will also make it more difficult for banks to maintain their trade secrets and will reveal when banks are under-investing. The upside from greater disclosure, however, is significant, with the positive effect evidenced by the recent improved disclosure of Santander’s Getnet payments entity, on the basis of which Morgan Stanley increased their valuation by 5%.

- **7% valuation uplift from actions to drive sustainable returns through the cycle.** Investors continue to underestimate the fundamental value of the CIB business models and the potential for growth as the global economy emerges from the deep shock of the last year. Based on our analysis global banks can sustainably deliver 2020 levels of return (RoE of 12%), however the market expects the business to revert to pre-pandemic levels of return of ~9-10% RoE. This disconnect is driven in part by the market applying a CIB discount to high-returning businesses like Transaction Banking. Delivering returns of 12% could provide incremental valuation uplift of >$100BN in market capitalization for the largest banks.

Our estimates are underpinned by three scenarios for CIB revenue evolution over the next three years:

- **Our central case, Full Recovery,** assumes governments follow the American Rescue Plan Act with continued near-term fiscal stimulus over 2021-22. Fiscal and monetary policy remains accommodative over the forecast horizon. Vaccine roll-outs are successful in limiting further widespread outbreaks. There is a solid rebound in the global economy with credit defaults limited to the sectors most exposed to the pandemic.

- **In our Runaway Recovery upside scenario, multiple rounds of stimulus supercharge the global economy. Fiscal policy remains accommodative through 2023, though monetary policy starts to tighten as QE tapers in 2021 and rates rise in 2022. Coordinated efforts by governments and the pharma sector ensure rapid, effective vaccine roll-out globally. Default rates are low at 3% due to rapid recovery and ongoing government support.
By 2023, we estimate revenue growth to rebalance and decline 1.8% from the highs of 2020 in our central case Full Recovery scenario. We estimate that this will be driven by softening in Capital Markets revenues (-5.3%), a continued favorable environment for IBD (0.4%) as the M&A boom under way has some momentum to run, and continued interest rate headwinds in Transaction Banking (0.2%) and Lending (-0.2%).

Exhibit 4:
CIB revenue projections for three modelled scenarios $BN

<table>
<thead>
<tr>
<th>Delta YoY (Data in %)</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>-10.9</td>
<td>-2.8</td>
<td>-0.8</td>
<td>-7.3</td>
<td>-0.2</td>
<td>2.4</td>
<td>-2.7</td>
<td>0.3</td>
<td>2.7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Coalition proprietary data, Oliver Wyman analysis.
### Exhibit 5: Scenario Descriptions

<table>
<thead>
<tr>
<th>Partial Recovery</th>
<th>Full Recovery</th>
<th>Runaway Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Policy measures:</strong></td>
<td><strong>Policy measures:</strong></td>
<td><strong>Policy measures:</strong></td>
</tr>
<tr>
<td><strong>Near-term fiscal stimulus</strong></td>
<td><strong>Medium-term fiscal policy</strong></td>
<td><strong>Monetary policy</strong></td>
</tr>
<tr>
<td>• All temporary measures from American Rescue Plan Act expire with no additional fiscal stimulus, European countries pause on meaningful additional fiscal stimulus</td>
<td>• US makes some measures of American Rescue Plan Act permanent with some additional stimulus measures passes in 2021-22, moderate fiscal stimulus passed in European countries</td>
<td>• Many temporary measures from American Rescue Plan Act are extended permanently and administration passes a large infrastructure bill in 2021-22, with European countries also approving large fiscal stimulus</td>
</tr>
<tr>
<td><strong>Medium-term fiscal policy</strong></td>
<td><strong>Monetary policy</strong></td>
<td></td>
</tr>
<tr>
<td>• Political pressures, debt sustainability and inflationary concerns result in fiscal tightening in 2022</td>
<td>• No tax increases or spending cuts as fiscal policy remains accommodative</td>
<td>• Fiscal policy remains accommodative through 2023 driven by public pressure to support recovery and drive to full employment</td>
</tr>
<tr>
<td><strong>Trade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Geopolitical tensions escalate resulting in increasing trade barriers</td>
<td>• Geopolitical and trade tensions gradually ease, with rapid thaw between US and Europe</td>
<td>• Geopolitical tensions significantly de-escalate which results in widespread easing of trade barriers (including US and China)</td>
</tr>
<tr>
<td><strong>Pandemic evolution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Variants continue to emerge which are resistant to current vaccines</td>
<td>• Vaccine rollout on schedule, herd immunity reached in developed countries during late summer</td>
<td>• New vaccines and increased distribution accelerate efforts, herd immunity reached in developed countries in spring/early summer</td>
</tr>
<tr>
<td></td>
<td>• Pandemic hotspots continue to flare across globe resulting in opening and closing of borders and periodic lockdowns</td>
<td>• Coordinated effort by governments and pharma sector ensure rapid rollout of vaccines in developing countries</td>
</tr>
<tr>
<td></td>
<td>• Isolated outbreaks in some developing countries persist, but borders largely reopen, lockdowns are absent from developed countries</td>
<td>• Borders and economies re-open and stay open</td>
</tr>
<tr>
<td><strong>Macro environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Weak global recovery</td>
<td>• Solid rebound in global economy led by Asia</td>
<td>• Surging global economy as policy response and pent up demand exceed expectations</td>
</tr>
<tr>
<td></td>
<td>• Global GDP increases to 4.7% in 2021, with recoveries of 2-3% in Europe and US</td>
<td>• Global GDP rises 8.1% in 2021; European and US economies grow 5-10%</td>
</tr>
<tr>
<td></td>
<td>• US unemployment rate stays high at 7.5% in 2021, with persistent unemployment at 6.9% in 2022</td>
<td>• US labor market rebounds with unemployment dropping to 4.8% in 2021, and 3.5% in 2022</td>
</tr>
<tr>
<td></td>
<td>• Falling global trade</td>
<td>• Sharp rebound in trade as economies re-open</td>
</tr>
<tr>
<td></td>
<td>• Global indices down 10-20% in 2021</td>
<td>• Global indices rise 10-15% in 2021</td>
</tr>
<tr>
<td></td>
<td>• Volatility in 2021 due to pandemic and stimulus uncertainty, but in 2022-23 is subdued by low growth, low rates and ongoing QE</td>
<td>• Heightened volatility in 2021 and 2022 given investor concerns over stimulus and inflation</td>
</tr>
<tr>
<td><strong>Yield curve</strong></td>
<td><strong>Yield curve</strong></td>
<td><strong>Yield curve</strong></td>
</tr>
<tr>
<td>• Yield curve flattens on expectations of weak recovery</td>
<td>• Moderate steepening of the yield curve</td>
<td>• Sharp steepening of the yield curve</td>
</tr>
<tr>
<td>• 10y T rates at 1.35 by 4Q21</td>
<td>• 10y T rates at 1.70 by 4Q21</td>
<td>• 10y T rates at 2.00 by 4Q21</td>
</tr>
<tr>
<td><strong>Credit</strong></td>
<td><strong>Credit</strong></td>
<td><strong>Credit</strong></td>
</tr>
<tr>
<td>• Default rates at 8% as recovery is weak and government assistance is withdrawn</td>
<td>• Default rates at 6% as defaults are contained to sectors most exposed to pandemic shock</td>
<td>• Default rates at 3% as rapid recovery and continued government backstop results in few defaults</td>
</tr>
<tr>
<td>• Credit spreads widen to 150 bps (IG), and 600 bps (HY and Loans)</td>
<td>• Credit spreads are 100 bps (IG), 350 bps (HY) and 400 bps (Loans) on steady recovery</td>
<td>• Credit spreads narrow to 80 bps (IG), 300 bps (HY) and 370 bps (Loans)</td>
</tr>
</tbody>
</table>

Source: Oliver Wyman analysis, Morgan Stanley Research.
Double Down on Transaction Banking

- **Transaction Banking is undervalued.** Strong fundamentals aren’t fully recognized by the market. And while banks have missed out on >$1TN value creation in the broader payments ecosystem as nimble non-banks have captured growth, we believe the market understates the latent value of wholesale Transaction Banking business models.
- To sustain CIB returns of 12% ROE through the cycle and attract higher valuations – while also positioning for future growth – Transaction Bank management teams must:
  - **Optimize:** Reset the commercial model and optimize the balance sheet to replace revenues lost in 2020 and build a more resilient fee-based business model that is geared to upside as rates recover
  - **Grow:** Gear to capture >$400BN in medium-term revenue opportunity from shifting to services-based models such as Banking-as-a-Service ventures, offerings targeting B2C and C2B flows and deep sector ecosystems
  - **Integrate:** ‘Use or lose’ group-wide payments assets to narrow the valuation disconnect between banks and non-banks and minimize risk of disintermediation – or realize external value through divestment
- Together, these levers can drive a 6-8% pts uplift in Transaction Banking ROE by 2023, and deliver upside over the medium-term
- Better disclosure on Transaction Banking economics can drive 8% valuation uplift for CIBs

Hidden Value in Transaction Banking

The market has not fully recognized solid fundamentals. Transaction Banking is largely an infrastructure and technology business with strong fundamentals that compare favorably to other parts of CIB. This is particularly true of the Payments and Cash Management business, given low levels of capital consumption for these activities. Transaction Banking revenue volatility is 2-3x lower than Capital Market products, and client stickiness related to core systems integration makes this business a stable source of earnings. The business is also a critical source of reliable low-cost funding for the bank, bringing in deposits at up to 30bps1 lower cost than Wholesale funding. Overall, the business standalone delivers through the cycle ROE of 30-45%, even delivering 30% ROE in 2020 during the pandemic. Yet the business is largely valued like the rest of CIB – as a risk and balance sheet intensive business.

Banks have missed out on the substantial value growth in payments. The past decade has seen exceptional value creation in the broader payments ecosystem (defined to include both retail banking payments and non-bank payment firms such as card schemes, acquirers, payments processors and adjacent providers). This ecosystem delivered ~$14TN in revenue in 2020. Of that market, non-bank players account for ~20% of total revenues, equivalent to the size of wholesale Payments and Cash Management revenues – yet these businesses are attracting on average ~35x higher price-to-earnings multiples than banks and the market capitalization of the top 10 largest non-bank payments players are now worth ~$400M more than the top 10 banks. >$1TN has been added to the market capitalization of non-bank players such as Square, Adyen and MasterCard over the past three years, with banks having lost >$1TN over the same period.

---

1 Goldman Sachs 4Q20 Strategic Update Presentation
Exhibit 6:
Banks are the market share leaders in most PCM products across wholesale and retail but are comparatively less well positioned for growth vs. non-banks

Payments ecosystem market map – 2020 revenues, growth outlook and P/E multiples

<table>
<thead>
<tr>
<th></th>
<th>Banks (BN)</th>
<th>Payment networks (BN)</th>
<th>Non-bank acquirers (BN)</th>
<th>Payment infrastructure &amp; adjacent providers (BN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesale Payments &amp; Cash management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net interest income</td>
<td>$130</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recurring fees</td>
<td>$30</td>
<td>&lt;$5</td>
<td>$20</td>
<td></td>
</tr>
<tr>
<td>Transactional fees</td>
<td>$70</td>
<td>$15</td>
<td>$25</td>
<td></td>
</tr>
<tr>
<td>Linked-FX</td>
<td>$35</td>
<td>&lt;$5</td>
<td>&lt;$5</td>
<td>$25</td>
</tr>
<tr>
<td>Retail &amp; merchant payments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net interest income</td>
<td>$600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transactional fees1</td>
<td>$190</td>
<td>$75</td>
<td>$35</td>
<td></td>
</tr>
<tr>
<td>Account fees2</td>
<td>$65</td>
<td>$30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value-added services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.g. terminal fees, analytics, reporting, cyber and fraud</td>
<td>&lt;$5</td>
<td>$10</td>
<td>$20</td>
<td>&lt;$5</td>
</tr>
<tr>
<td>2020 Revenues</td>
<td>$1120</td>
<td>$105</td>
<td>$135</td>
<td>$50</td>
</tr>
</tbody>
</table>

Outlook
- Strong growth
- Modest pressure
- Modest growth
- Strong pressure

Average Consensus NTM P/Es4
- 12x
- 38x
- 58x
- 27x

1. Transactional fees includes issuer and acquirer-based fees; 2. Account fees include those charged to account holders, including ACH, cheque processing and overdraft fees; 3. Includes full banking industry; for all other categories based on latest data available. Revenues from card issuing business segments from payment networks have been allocated to Banks. 4. Consensus NTM P/E ratios from 12/31/2020 For banks, average based on global banks. Source: Refinitiv Datastream, Coalition proprietary data, Oliver Wyman analysis, company annual reports and investor presentations.

But non-bank advantages are not insurmountable. This valuation disconnect is only partially explained by the advantages of non-bank business models – many of which are also available to banks. Non-banks benefit from concentration in the high growth sector of e-commerce – a segment that has fueled payments growth and benefited from changes in consumer and business behaviours that have emerged during the pandemic.

Exhibit 7:
E-commerce is supercharging growth in payments. This trend has been accelerated by the pandemic with growth in retail sales driven by e-commerce in the US offsetting much of the decline in non-e-commerce volumes

US retail sales volumes, $TN

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail e-commerce sales volume</td>
<td>3.2</td>
<td>3.3</td>
<td>3.0</td>
<td>3.7</td>
</tr>
<tr>
<td>Retail non-e-commerce sales volume</td>
<td>3.0</td>
<td>3.1</td>
<td>3.2</td>
<td>3.4</td>
</tr>
<tr>
<td>1. We assume total spending grows at 7% CAGR 2021-2022 and then at a normalized 4% CAGR in 2023-2024. Source: eMarketer (Statista), Morgan Stanley Research estimate, Oliver Wyman analysis.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Overview of non-bank payments players

Non-bank players in the Payments ecosystem include established incumbents and a wide range of FinTechs and consortia. The rapid growth and increased market share of this segment present both opportunities and challenges for Wholesale banks.

**Payment networks**: These are companies that provide the network used to connect acquiring banks (i.e. those that support merchants) to issuing banks (those that issued the card to the customer). The payment network is responsible for connecting the two banks, supporting the authorization of the payment and the clearing and settlement of the transaction. These networks receive a network fee from merchant processors and from card issuers on each transaction. Example networks include Visa, MasterCard, UnionPay, and American Express.

**Merchant acquirers**: These are the owners and managers of the payments relationship with merchants who provide merchants access to card and electronic payments by working with merchant processor partners to facilitate the transaction. They earn fees from merchants on each transaction and use a portion of the spread to facilitate the transaction by paying card issuers (interchange), processors, and networks. This group includes traditional merchant acquirers (e.g. FIS post Worldpay acquisition), newer, fast growing players such as software providers (e.g. business management software) that have integrated payment processing capabilities thus becoming acquirers (e.g. Square, Shopify, Adyen), and end-to-end players who own relationships with both merchants and consumers (e.g. PayPal).

**Payment infrastructure and adjacent providers**: These are a wide variety of companies that include both electronic payment rails and companies that provide services adjacent to payments. Electronic payment rails companies include traditional cooperatives and consortiums (e.g. SWIFT) as well as newer companies that leverage distributed ledgers (e.g. Ripple). Additionally, this category includes service providers for payment adjacent areas, including Money Transfer / Remittance services (e.g. Transferwise, Remitly) and FX providers (e.g. MoneyCorp); pre-payment service or “source to pay” providers (e.g. Coupa, Basware, Tradeshift) that help facilitate sourcing, procurement, and invoicing; Treasury Management Systems and Payment Hubs providers (e.g. Kyribia, Ion); Accounts Payable and Accounts Receivables automation providers (e.g. AvidXchange, High Radius, Bill.com); “Buy Now Pay Later” point of sale credit companies (e.g. Zilch); and fraud management companies (e.g. Quantexa).

Optimize: To Recoup Lost Revenues of 2020

**Banks should rebuild around a fee-based model.** The pandemic has exposed underlying vulnerabilities in the Transaction Banking business model, with $12BN revenues lost in 2020. The traditional Transaction Banking business model is highly geared to what are in effect ‘passive’ revenue streams driven largely by interest rates: 75% of growth in PCM revenues from 2016 to 2019 came from Net Interest Income. While this was a boon for the whole CIB industry over the past cycle, these gains were largely wiped out with the steep interest rate declines of 2020.

Exhibit 8:
Transaction Banks can shift to more resilient recurring fee income to recover lost revenue from NIM compression

<table>
<thead>
<tr>
<th>Category</th>
<th>'16-'19 CAGR</th>
<th>'19-'20 YoY</th>
<th>Growth outlook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurring fees</td>
<td>2.7%</td>
<td>-4.4%</td>
<td></td>
</tr>
<tr>
<td>Transactional fees</td>
<td>2.0%</td>
<td>-10.2%</td>
<td></td>
</tr>
<tr>
<td>Payment linked FX</td>
<td>0.7%</td>
<td>-0.4%</td>
<td></td>
</tr>
<tr>
<td>Net interest income</td>
<td>3.6%</td>
<td>-17.7%</td>
<td></td>
</tr>
</tbody>
</table>

1. Recurring fees include Liquidity and account management fees; 2. Transactional fees include Payments and receivables/collections and cards. Source: Coalition proprietary data, Oliver Wyman analysis.
This shift in fortunes for the Transaction Banking business provides an opportunity — and an imperative — for the industry to reset the commercial model with a shift from rate-driven NII to fee-based revenue. Banks must transition to a model that is more aligned to non-banks – who drive >80% of PCM revenues from recurring fees, vs. <20% for banks. Delivering this change is operationally challenging — including data limitations and cultural barriers — yet the commercial pressures of reduced rates make this shift an imperative for management teams. Banks can also optimize liability management, drive better returns on the Lending balance sheet, and improve cross-sell. Together, these actions can drive $16BN revenue gains and 6-8% pts of ROE uplift (on a 30% starting ROE) over the cycle, more than recouping the losses of 2020.

**Exhibit 9:**
Transaction Banks can generate 6-8% pts ROE uplift in the near-term from increased pricing and balance sheet discipline

**Transaction Banking**

<table>
<thead>
<tr>
<th>ROE uplift from near-term levers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020 TB ROE</td>
</tr>
<tr>
<td>Fee revenue pricing</td>
</tr>
<tr>
<td>Liability management</td>
</tr>
<tr>
<td>Lending optimisation &amp; cross-sell</td>
</tr>
<tr>
<td>ROE post levers</td>
</tr>
<tr>
<td>30%</td>
</tr>
<tr>
<td>+1.5-2.5%</td>
</tr>
<tr>
<td>+1.5-2.5%</td>
</tr>
<tr>
<td>+3-4%</td>
</tr>
<tr>
<td>6-8%</td>
</tr>
</tbody>
</table>

1. Includes Payments and receivables, cards, liquidity and account balances, traditional trade, supply chain finance, structured trade finance, payments-linked FX and trade-linked FX. 2. Includes cross-sell from lending and linked FX. Source: Coalition proprietary data, Oliver Wyman analysis.

**Data-led pricing discipline can drive 10-20% growth in fees.** Pricing disciplines in Transaction Banking are often weak. Rising rates over the last cycle in many markets made capturing deposits the priority. Those deposits are now worth considerably less to the bank. Fees are often waived, sometimes for over 5 years, in order to win clients’ business. Pricing data is often poor and pricing agreements rely on judgement of relationship managers (RMs), rather than data science. In our central case outlook, we don’t expect policy rates to rise until after 2022. Banks need to reset the commercial model away from interest-rate driven NII and in favor of recurring fee revenue such as channel fees, servicing fees and subscription pricing fees. These earnings are more stable, more valuable, and more resilient in a downturn than interest-rate driven NII. Even transactional fees are less attractive than recurring fees, as they are linked to GDP and client demand and more subject to margin compression.

**Exhibit 10:**
Non-bank payment providers generate 4x higher recurring fee income than banks

**Share of recurring fees to total revenue**

<table>
<thead>
<tr>
<th>% change in recurring fee to total revenue FY17-FY20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Banks</td>
</tr>
<tr>
<td>Non-Bank FS players</td>
</tr>
<tr>
<td>Non-FS players</td>
</tr>
</tbody>
</table>

1. Recurring fees refers to subscription-based fees and revenue not directly linked to transactions. For Global Banks, this includes channel fees, servicing fees, account maintenance, recurring value-added service revenue etc. 2. Latest data available where FY20 is unavailable 3. Coalition Index Banks 4. FS players include processing payment providers (e.g. Microsoft, Adobe) | Source: Coalition proprietary data, company annual reports, Oliver Wyman analysis.

To shift to a more fee-based model, banks should:

- **Reduce revenue leakage** from billing errors and data management through one-off historical reviews, and investment in modernizing billing systems to capture client data from across the relationship.
- **Re-set standard pricing tariffs**, which will be immediately passed through to clients on standard tariffs, and provide a higher baseline for discounted tariffs.
- **Introduce innovative value-based pricing models** such as dynamic relationship-based pricing for CIB clients, and subscription or packaged pricing for small business clients, together with providing RMs with better data and insight into achievable pricing outcomes.
- **Review discounts and fee waivers**, removing value-destructive discounts and better align discounting to client value. There is often limited correlation between discounting and client relationship value. Our work across the industry shows that around a quarter of Transaction Banking discounting is granted to clients that deliver returns below the cost of capital over a multi-year horizon. Removing or renegotiating these discounts to sub-hurdle clients could deliver a 5-10% pt uplift in fee revenue for Transaction Banking. Banks can invest in analytical tools to provide RMs pricing support and reduce the reliance on RM discretion, while also aligning RM incentives, to manage against inappropriate discounts.
Exhibit 11:
Optimizing the commercial model could deliver 10-20% growth in fee income.

Fee revenue growth levers

- Revenue leakage
  -1-3%
- Standard tariff review
  ~-3-5%
- Pricing innovation
  ~-1-3%
- Discounting
  ~-5-10%
- Fee revenue potential
  +10-20% uplift

Winning banks have been able to deliver >25% uplift in fee revenue from these levers.

Source: Oliver Wyman analysis.

Improved liability management can optimize current footprint.
The Transaction Bank sits at the heart of the core function of a bank: liability transformation. Low cost, sticky deposits are gathered in tandem with PCM and trade activities, and these are then used to fund the asset side of the balance sheet. Yet for many banks, asset and liability management has become disconnected, and liabilities are often mis-priced; we see opportunities to extract value from more dynamic and data-driven liability pricing:

- Modernize Funds Transfer Pricing (FTP). Group-level FTP schemes that define the value of Transaction Bank deposits to the Group are often rigid, insufficiently granular, and not consistently aligned to changing deposit values. This can incentivize improper behaviors and muddle the value story for the Transaction Bank. As an example, 2020 saw increases of >15% in CIB TB deposits held by global banks — and while FTP schemes compensated Transaction Banks for these deposits, we estimate that they resulted in an ROE drag of 20-30 bps due to the low yield of non-lending assets in which they were placed. To modernize FTP processes and drive deposit gathering behavior that is more aligned with bank funding requirements, banks can use more granular segments when assigning liquidity and duration characteristics to better value deposits and deploy a more comprehensive set of liquidity constraints in FTP calculations.

- Charge for negative rates. In Europe, interest rates have now been negative for over five years. Despite this new normal, many banks have been reluctant to charge clients for negative-yielding deposits. We see this as a critical lever for incentivizing appropriate deposit gathering behavior and extracting value, and estimate that banks that do charge for negative rates can generate an additional 50-100 basis points of ROE overall.

- Optimize client level pricing. Finally, we see upside for banks that optimize client level deposit pricing through increased sophistication and granularity, reflecting an understanding of client-specific dynamics. Leading banks consider a client’s rate sensitivity, the expected stickiness and volatility of the deposits, and the fully loaded deposit value when pricing deposits. In geographies that have had higher rate environments in recent years (e.g. the US, pockets of Asia), we have observed NII uplifts of 10-15% for banks that successfully implement data-driven deposit pricing enhancements. Yet, data quality remains a current barrier to this tactic for many banks.

Strengthen discipline on credit extension and monetization.
There is also optimization to be had on the asset side of the balance sheet. Traditionally, relationship lending — in the form of term loans or revolving credit facilities — has been seen as the entry ticket to access the valuable Transaction Banking wallet. Many corporates explicitly set Treasury policies to state that Transaction Banking and FX wallet can only be allocated to banks participating in their credit facility. Yet, for the CIB segment, standalone returns for vanilla lending are low, at 4% ROE on average. Given differences in product portfolios, data limitations, and process challenges around holding bankers accountable for credit decisions, many banks continue to lend too much for too little return. The disparities are significant: leading global banks deliver 2.5x the level of cross-sell on lending balance sheet as regional banks through a culture of cross-sell. If the laggards were to narrow the gap to peers — either by rationing lending balance sheet, or by more systematically driving cross-sell — they could add an average of 2-3% pts to Transaction Banking ROE.

Exhibit 12:
Banks are still lending too much for too little — laggards have significant upside from better discipline.

2020 Payments and Cash Management cents revenue per $1 of vanilla loans balance sheet, average

Average 1.5c

<table>
<thead>
<tr>
<th></th>
<th>Large regional banks</th>
<th>Global banks winning with size</th>
<th>Global banks with highly differentiated propositions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.9c</td>
<td>1.1c</td>
<td>2.5c</td>
</tr>
</tbody>
</table>

Source: Coalition proprietary data, company financial statements.
However, over time, the link between lending and Transaction Banking is weakening, creating opportunities for banks to be far more selective in the deployment of credit. Transaction Banking mandates are increasingly being awarded by departments other than Treasury – for example by Sales, Marketing or Product Management. Sales cycles are moving away from request-for-proposal (RFP) approaches, to joint venturing and co-creation with qualified partners. Switching costs are lower, making it easier for clients to onboard new providers and diversify away from core lending partners. And some of the most attractive and fastest growing client prospects tend to have low financing requirements, for example technology or platform businesses. Leading banks are accelerating returns growth by proactively skewing their client portfolio to the most attractive sectors, and thereby reducing dependency on lending.

**Medium-term upside for those who act quickly.** By resetting the business model to a more resilient fee-based one, banks who move quickly will be positioned for even more upside. As rates recover in the medium term, particularly in the US and Asia, we estimate upside of 15-20bps in Net Interest Margin – equating to ~$4BN of revenues for global banks – for every 100bps increase in rates. Further upside can be captured from the bold medium-term plays explored in this paper.

### New payments structures are changing the game

**Banks need to keep their eye on the creation and use of central bank digital currencies (CBDCs).** Over the past year, there has been a growing wave of interest in the topic as central banks look to deploy distributed ledger technology to digitize central bank clearing and settlement, and to pre-empt the emergence of private stablecoins as an alternative to fiat currencies. Though still in the early stages of adoption, most major economies are actively pursuing CBDC initiatives with scope for them to bring a step-change in payment efficiency, convenience, financial inclusion, and automation. Some countries are already in more advanced stages, such as Sweden and China who are in the ‘late pilot’ stage. There are also private firms launching their own digital currencies, for example, Facebook’s Diem, which is backed by an association of member corporations rather than a central bank.

**The creation of CBDCs poses a risk to the banking industry.** CBDCs could develop in a number of directions, with different levels of disintermediation for incumbent banks. The key determining factor for the nature and severity of risks posed to banks is the evolution of the distribution model for CBDC. One potential outcome is a centralized model where the central bank has direct access to a centralized ledger. Alternatively, decentralized ledgers could be established with parts of the service delegated to private actors (e.g. banks, payment service providers). A centralized distribution model would pose greater risks to banks:

- Deposits being placed directly with central banks, which would fundamentally change the banking business model, increasing banks’ funding costs as low rate deposits become scarcer and/or limit banks’ abilities to support credit activities
- In stress events companies may view CDBCs as a safe haven as they might trust the credit worthiness of the central bank over that of their banking partner, creating liquidity issues at a time when banks can least afford them
However, we view a decentralized model as the most likely outcome in most geographies as it is very challenging for central banks to manage everything on their own account. In addition, central banks are conscious of the adverse impacts a centralized model could have on the banking industry for execution and settlement. While this model has fewer risks to the banking industry than a centralized model, risks still exist, including:

- Instant settlement resulting in lower Net Interest Margins (NIM), lower transaction costs and fees
- Central banks partnering with non-banks to deliver parts of the value chain, and thus facilitating loss of bank share

**What should banks do to prepare for the introduction of CBDCs?** In geographies where a centralized model is pursued, banks should identify their preferred regulatory policies and advocate for them. Questions to consider are: should there be limits on the amount of CBDC? should governments be required to increase deposit insurance during a crisis to prevent a flight to CBDC? will central banks ensure that rates provided reflect the lower credit risks associated with central banks, including the use of negative rates in low interest rate environments? In geographies where a decentralized model is pursued, banks should position themselves to be trusted Central Bank partners across the value chain, including supporting customer due diligence, front-end interfaces, and merchant service capabilities.

Independent of the distribution model, by pursing the recommendations detailed throughout this report, banks will be better prepared for a world where CBDCs are prevalent. Improving payment and cash management capabilities and solutions and targeting clients and sectors with greater AR and AP needs will help ensure stickier relationships as clients will be more likely to be dependent on a bank’s full suite of capabilities. By increasing the share of fee revenue, banks are more resilient to a loss of NII associated with a reduction in their deposit base, and potential decreases in NIM from instant settlement. By being smarter about their lending opportunities, banks can help ensure that a reduction in their liquidity base is less painful.

**Grow: Target Bold Value Creation**

**Medium-term revenue opportunity of >$400BN from shifts to a services-based model.** Market structure change threatens the legacy business model, yet it also opens up an attractive growth opportunity for those able to capture it. We see three bold plays that banks can pursue to defend against disruption and create value: developing Banking as a Service (BaaS) solutions, doubling down on B2C and C2B opportunities, and building bank-led sector ecosystems. We estimate that banks can gain >$400BN in additional revenues by 2030 from these solutions, equivalent to the entire existing wholesale Transaction Banking revenue pool today.

**Disruption sets the scene for longer-term strategy.** Fundamental changes in market structure are afoot, most notably the growing prevalence of central bank mandated real-time payments and digital ledger technologies that are forcing the modernization of payment rails. Against this backdrop, clients are increasingly expecting 24/7 global and real-time payment and liquidity management services, all delivered in an intuitive and efficient way and embedded into their businesses. New competitors are bringing lower cost cloud-based solutions, integrated value-chain offerings, and digital wallets to market – prompting a wave of technology innovation from established players. There is increased dissatisfaction with bank solutions, and the barriers to switching banks are reducing. While ~85% of corporate treasurers feel that best in class products are critical to the banking relationship, less than half believe that banks are delivering these.

These forces are driving changes in market structure that are breaking apart the legacy ‘vertically integrated’ model in which banks own the customer, product provision and processing layers. This legacy model is facilitated by a number of crucial advantages banks have historically held, including sticky client relationships, ownership of deposits and scale. But increasingly new entrants are disrupting this model. If banks fail to adapt, they risk partial disintermediation in which non-banks own the front to back payments value chain for many of the highest return markets and segments. While banks currently remain advantaged providers of much of the wholesale payments value chain, there is early evidence of the value chain breaking down in parts of the market already, as described in *Asia: The canary in the coalmine for legacy Transaction Banking*.

---

2 Source: CGI Transaction Banking Survey 2020
Driving forces of disruption, competition and market structure

- **New entrants are gaining share.** Today, the competition for Wholesale bank Transaction Banking businesses comes mostly from incumbents. But new entrants like Goldman Sachs and challenger banks are gaining share with lower costs thanks to API-driven platforms built on the cloud. Non-banks are picking up share as plug and play FinTechs on various sides of the equation (payments, reporting, transaction data services etc) are moving in via partnerships or standalone offerings. Over the last 3-5 years, the non-banks in this space have pulled in $290BN in revenues in the payments and cash management space across wholesale and retail, now representing 20% of the total. Technological market developments and evolving client expectations set the backdrop for further potential disruption.

- **One of the barriers to entry for non-banks is deposits, which are already becoming less attractive in Europe and Japan given negative rates.** While liquidity and deposit management are currently a barrier to entry to meaningful scale in Transaction Banking, this is beginning to fray at the edges given persistent negative rates in Europe and Japan and as bank regulators relax barriers to the deposits business in the US. With negative rates, Europe is in the eye of this storm as banks themselves offer corporate clients cheaper alternatives to excess deposits which they have to charge for. This intensifying trend is forcing corporate treasurers to look for more innovative ways to manage liquidity.

- **FinTech disintermediation is poised to accelerate as regulatory barriers fall.** Corporates can increasingly partner directly with FinTechs to launch payment solutions that distance banks from end customers. We see this happening already in Asia. In the US, the FinTech Banking Charter and ILC (Industrial Loan Corporation) approval processes have picked up steam, enabling non-banks to enter the deposit gathering business. So far this has been limited to non-bank financial institutions like Square, but we shouldn’t be surprised to see a broader set of non-banks apply – especially companies like Walmart, which has had its eye on the ILC charter for many decades.

Based on these driving forces, we see three key scenarios for how the market structure could evolve, underscoring the need for banks to move quickly

- In our first scenario, **Bank-Led Ecosystems** prevail as banks are able to upgrade front-end offerings and continue to dominate across the value chain of products and solutions, maintaining client stickiness and pricing power. We are starting to see examples of bank-led ecosystems play out, through solutions launched for specific client segments by many global banks.

- In our second scenario, non-bank players establish ownership of the client interface in a **Disrupted Front-End** model, enabling clients to plug into multiple ecosystems. Front-end service providers still rely on banks for modular product solutions and the back-end payment rails, but the value chain is broken up and there is significant erosion to banks’ ability to drive recurring fee-based revenues and innovate value-added services. Examples of this model are emerging through Banking-as-a-Service portal offerings that enable a more modular approach.

- In our third and most disruptive scenario, a **Non-Bank Revolution** sees non-banks compete across the value chain, driving massive fee compression driven by lower cost payment rails, such as digital wallets. This scenario also contemplates a negative impact on bank NII from a loss of float as the bulk of payments shifts to real-time and from non-bank players engaging directly in the core bank proposition of deposit-taking. In Asia we see examples of this materializing already where non-banks capture the front-to-bank payments value chain.
### Exhibit 14:
Banks that fail to adapt to changing market structure risk full disintermediation

Potential future market structure scenarios in wholesale payments and cash management

- **TRADITIONAL MODEL**
  - Banks with front-end distribution and deliver end-to-end client solutions
  - Limited change in fee and net interest income value capture and mix

- **1. BANK-LED ECOSYSTEMS**
  - Upgraded front-end bank platforms, with integrated products and solutions (some 3rd party)
  - Payment volume increase from new channels; value chain break-up puts downward pressure on fees and net interest income

- **2. DISRUPTED FRONT-END**
  - Banks disintermediated with non-banks capturing much of distribution layer
  - High fee compression and net interest income reduction as non-banks capture deposits

- **3. NON-BANK REVOLUTION**
  - Non-banks compete across value chain; banks provide product into non-bank ecosystems

**Key:**
- Bank provided
- New entrants/structures

Source: Oliver Wyman analysis.

In practice we expect each of these scenarios to play out to different degrees in different sections of the market.

---

**Three bold plays to capture growth.** But some banks are also uniquely positioned to capture a wave of growth in payments, drawing on their assets. They have large and loyal customer networks that few FinTechs can replicate. They have banking licenses and connectivity to clearing systems. Some have scale infrastructure to process payments at low unit cost. These banks can deliver on three bold plays for value creation, capitalizing on new market structures and client-led demand.

**Exhibit 15:**
Three bold growth plays can drive >$400BN in Total Addressable Market for the industry

**2030 Total Addressable Market, $BN**

- **Revenue opportunity within Wholesale CIB business**
  - % bank revenue opportunity
  - 25-50 Bank-led ecosystems
  - 100-150 BaaS solutions
  - 250-300 B2C/C2B solutions

Revenue opportunity will require bank-wide participation, not limited to the wholesale CIB perimeter

**Source:** Oliver Wyman analysis.

---

**Build Banking-as-a-Service (BaaS) solutions.** New business models are emerging that can supercharge growth for Transaction Banks. The wholesale BaaS market could represent a $100-150BN opportunity by 2030. Banks can provide embedded financial products to third parties via APIs, and leverage existing assets: product capability, technology and operations, balance sheet, and banking licenses. There are a wide range of BaaS business models emerging across Transaction Banking and related products, ranging from full end-to-end, white-labelled services, to selective ‘last mile’ clearing connectivity.
Exhibit 16:
We see four key archetypes of BaaS models, spanning a range of services and product offerings across businesses

**Framing the BaaS archetypes set**

<table>
<thead>
<tr>
<th>Range of services and product offerings across businesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payments</td>
</tr>
<tr>
<td>Channel</td>
</tr>
<tr>
<td>Balance sheet/risk taking</td>
</tr>
<tr>
<td>Product</td>
</tr>
<tr>
<td>Technology</td>
</tr>
<tr>
<td>Operations</td>
</tr>
<tr>
<td>Clearing &amp; settlement connectivity</td>
</tr>
</tbody>
</table>

**End-to-end offering**
 Provision of full front-to-back services (channel, product, operations and execution)

**Product as a service**
 Provision of all services (including technology and operations) excluding channel

**Infrastructure as a Service**
 Provision of selected micro-services as a managed service (potentially enabled via API)

**Execution only**
 Clients plugging into the bank’s “last mile” clearing connectivity

Source: Oliver Wyman analysis.

Partners include smaller banks who increasingly struggle to cover the fixed costs of the Transaction Banking business. Banks spend a total of >$150BN on payments IT and operations, yet many regional banks face cost-income ratios >90% and are struggling with the cost of enabling new market infrastructure. We see a total outsourcing revenue opportunity of $50BN in providing infrastructure to sub-scale banks by 2030. New opportunities also exist to provide embedded financial products (from lending to payments to FX) to non-bank platform businesses. B2B platforms are forecast by Gartner to represent 75% of B2B procurement by 2025, and increasingly are looking to enrich their offering by providing embedded financial products, such as seller financing, embedded deposit accounts or supply chain finance. Platform businesses are looking to partner with banks and FinTechs to provide these capabilities.

Across the range of opportunities, BaaS offers incumbent banks the opportunity to access new customers at scale and in a cost-effective way, and to add scale to existing platforms to lower unit costs in the core business. But the bar is high. Partners require modern, modular product offerings; direct API connectivity; fully digital customer experience; and the ability to stand up a new venture in months not years. Early movers include Goldman Sachs and Citi, who have partnered with Stripe Treasury to provide embedded cash management services, and Standard Chartered, which has launched the Nexus BaaS platform.

- **Double down on B2C and C2B opportunities.** While the business-to-business (B2B) wholesale payments market that incumbent Transaction Banks serve is the largest market in volume terms, it is also the slowest growth market. Banks can target solutions that link corporates and end retail customers in order to capture the growth in the fastest growing business-to-consumer (B2C) and consumer-to-business (C2B) payments flows.

Exhibit 17:
Banks can develop tailored B2C and C2B solutions to tackle the fastest growing pockets of payments flows

**Global payment flow and CAGR by segment**

<table>
<thead>
<tr>
<th>Estimated global payment flows, 2019 US$ TN</th>
<th>CAGR 19-22</th>
<th>Key drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2C</td>
<td>20</td>
<td>6%</td>
</tr>
<tr>
<td>C2B</td>
<td>30</td>
<td>8%</td>
</tr>
<tr>
<td>B2C</td>
<td>65</td>
<td>7%</td>
</tr>
<tr>
<td>B2B</td>
<td>125</td>
<td>5%</td>
</tr>
</tbody>
</table>

Source: Oliver Wyman Analysis, IMF, Federal Reserve Bank, Statista (E-marketer).
While non-bank merchant services providers have built significant beachheads here, there are opportunities for banks to build targeted propositions that serve these client needs and capture the growth. Examples of successful propositions include DBS, which has built a solution to support real-time insurance claim settlement using real-time payments, allowing insurance companies to improve their customer experience, and reduce fraud and operational cost. Platform business models are also driving new opportunities, for example mass disbursement solutions for gig economy businesses. Together the B2C/C2B market represents a $250-300BN revenue opportunity for the industry by 2030. But banks will need to work hard to capture this opportunity, as it is heavily competed by non-bank specialists who can often build better propositions to meet end customer needs faster. For example, Stripe developed the driver payout capability for Lyft, a US-based ridesharing platform. To win here, banks will need to build low-cost and modular product capabilities, and innovate directly with customers to build propositions that work for them. They will also need to collaborate better across the organization to break down siloes, build targeted propositions, and cross-sell into their large retail and wholesale client networks.

- **Deepen bank-led sector ecosystems.** Coming out of the pandemic, it is clear that sector is king. There have been stark differences in credit quality between the worst hit sectors – such as travel – and those that have accelerated their growth during the crisis – such as e-commerce. The recovery will be equally polarized as laggards struggle to restructure and reboot client demand, and the fittest continue to thrive. Growth will disproportionately come from a few key sectors, such as technology and healthcare. Banks should proactively shape their client portfolios to capture this growth and to leverage existing strengths in client franchise and footprint.

Successful sector ecosystems require banks to focus on high growth sectors where the bank is positioned to win, proactively targeting client selection and balance sheet towards the most attractive sectors. Banks can bring deep sector expertise by investing in intellectual capital, and organizing sales and coverage teams along sector lines. Finally, those that have succeeded at developing sector ecosystem solutions do so together with customers. We see multiple examples of sector propositions in healthcare, such as the JP Morgan 2019 acquisition of InstaMed to develop its payments services suite and push further into US healthcare payments. We see increased prevalence of successful sector propositions in Asia (see Asia: *The canary in the coalmine for legacy Transaction Banking*).

Based on the success of such models to date, we estimate a revenue opportunity for the industry of $25-50BN, as banks can grow revenues using these sector-led strategies at more than double the pace of the rest of the market, while also delivering compelling economics for the bank. Banks who deploy these deep sector propositions typically deliver significantly better economics than the rest of the business: 15-20% higher return on RWA; up to 40% higher deposit balances, and 20-30% lower customer churn rates. While the cost of developing these ‘mass customisation’ solutions may be higher, this is easily offset by the value of the deeper relationship.

Banks that can successfully implement these strategies will strengthen the client interface and benefit from further scale advantages in lowering unit cost. They also have the potential to grow valuation in the medium term: these business ventures are high-growth, fee-based and sticky, and will provide evidence to investors that Transaction Banking is a technology business and should be valued as such.
Asia: The canary in the coalmine for legacy Transaction Banking

Pockets of bank disintermediation are already playing out in Asia. While scenarios of non-banks owning the front to back payments value chain may seem far-fetched, we can see evidence of this materializing in Asia already. For example, in Indonesia the service platform GoJek has released an e-wallet service “Go-Pay”, and the e-commerce platform Tokopedia has partnered with e-wallet FinTech Ovo. These examples speak to the risk of non-banks encroaching on banking markets and the undeniable threat to incumbent banks – these trends are accelerating, with 72% of e-commerce spend in China using digital wallet in 2020\(^3\), with increasing penetration into B2B payments. We only expect these trends to accelerate in Asia with the rise of hyper digitization, accelerated by the Covid pandemic and the associated growth in e-commerce. These same driving forces are present, albeit less mature, on a global scale, and the same types of threats to incumbent North American and European banks are potentially just one big press release away.

By looking to Asia, not only can we see that the threat is real, but we can also observe roadmaps and examples of how to adapt. In fact, many of our proposed medium-term business models discussed throughout this report originated in Asia. This includes:

- Sector-based solutions, such as Ping An’s creation of the healthcare software company Good Doctor as a component of its strategy to better serve that sector, or Banksteel’s e-commerce proposition for steel in China that expanded to include value-added services, after starting as an online register for buyers to sellers in 2013. DBS Bank partnered with natural rubber franchise Halcyon to launch HeveaConnect, a digital marketplace for the rubber industry, connecting farmers, producers and tire manufacturers with data and workflow capabilities, which aims to increase price transparency and streamline processing.
- BaaS propositions, such as Tencent’s distribution of financial service products

Today, the question banks in Asia are asking is how they can unlock the value of their local market expertise and their comparative advantages and leverage the rich data they sit on to generate insights and develop new growth propositions for clients. Banks across other markets need to be asking what foundations they should be laying in preparation for a similar market structure, and looking to Asia for inspiration.

---

3 Worldpay from FIS, 2021 Global Payments Report

Integrate: Use or Lose Embedded Payments Assets

Banks must prove they can be advantaged owners of embedded assets. Even as non-banks become more competitive, banks have valuable payments assets across the group that can be better leveraged. Many banks have legacy merchant services businesses and scale payments processing factories, and most have extensive wholesale and retail customer networks and rich customer data. But few are maximizing the shareholder value of these assets. They are often managed in a siloed way, underinvested and uncompetitive compared to the non-banks. Banks must now prove that they can unlock the value of these assets and address perceived structural advantages of non-banks.
Exhibit 18:
Banks can address perceived structural advantages of non-banks

<table>
<thead>
<tr>
<th>Capital requirements and accounting</th>
<th>Stringent regulatory capital requirements, and intangible assets (e.g. goodwill) deducted from solvency capital base</th>
<th>No enforced regulatory capital requirements</th>
<th>Structural gap: banks remain at a disadvantage in light of regulatory capital they must hold against their activities. Banks must work to offset this disadvantage with other areas of advantage such as customer network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor visibility &amp; transparency</td>
<td>Payments function as part of larger bank entity</td>
<td>Standalone payments entity</td>
<td>Disclose more information highlighting the value of the payments business; reinforce through investments in growing the business</td>
</tr>
<tr>
<td>Technology</td>
<td>Multiple legacy tech. systems, typically underinvested. 1-3% revs spent on innovation across the bank</td>
<td>More modern platforms with strong e-commerce capabilities &amp; &gt;10% revs spent on innovation on their propositions</td>
<td>Invest in modernizing platforms utilizing a modular, micro-service approach and co-create with clients to ensure it meets current and future needs</td>
</tr>
<tr>
<td>Client relationship</td>
<td>Multiple non-payments objectives to balance, often with siloed and/or competing incentives across the organization</td>
<td>Singular focus on driving commercial outcomes for payments</td>
<td>Reorganize sales &amp; coverage teams and functions to be more focused on delivering tailored client needs based solutions</td>
</tr>
</tbody>
</table>

Source: Oliver Wyman analysis.

Banks must take a hard look at where they are uniquely positioned relative to other banks, non-bank players, and client needs, and evaluate if they have the differentiated capabilities to compete. We argue that banks need to ‘use or lose’ their existing group-wide payments assets to maximize shareholder value and deliver on the bold plays that extend outside of the wholesale perimeter. That is to say, they either need to better integrate their wholesale, retail and merchant offerings and demonstrate shareholder value, or they should divest these assets and realize a higher external valuation. To ‘use it’, banks should take a leaf out of the non-bank playbook and seek to replicate their advantages wherever possible, whilst leveraging the unique network advantages of a bank:

- Invest in merchant acquiring capabilities to build out and enrich the offering with value-added services, gearing it to faster growth e-commerce sectors
- Deliver commercial excellence in proposition development, pricing and execution to grow margin
- Better integrate disparate capabilities across wholesale payments, retail and merchant and manage these capabilities in a cross-business manner
- Leverage the salesforce to cross-sell merchant acquiring into the existing customer base
- Mine existing transactional data across retail and wholesale to bring rich insights to merchants and corporates to help them grow their businesses, target customers and reward loyalty
- Create targeted B2C/C2B propositions that bridge wholesale and retail franchises
- Mirror FinTechs and define success based on long-term growth potential as opposed to managing against in-year profitability goals
- Explore opportunities to work together with other banks to reduce the risk of disintermediation by delivering differentiated propositions (for example, the European Payments Initiative which will provide cross-regional multi-channel payment rails)

For those unable to extract full value from the franchise, divestment of the merchant services business may deliver greater shareholder value, and allow the bank to partner with scale players with superior offerings. One example of a bank successfully divesting from components of its merchant services business is Fifth Third, which spun off its Merchant Acquiring business in 2009, selling 51% of a business valued at $2.4BN. The spun-off JV, Vantiv, was able to grow rapidly and significantly increase its valuation, with Fifth Third realizing a $1BN gain in 2017 through the sale of 3.7% of its stake in the business. In 2019, Vantiv was acquired by FIS at a valuation of $43BN, or 18x its valuation 10 years prior.
Exhibit 19:
Management teams need to act now to recoup lost revenues in the short term and position themselves to defend against disruption

Management actions

<table>
<thead>
<tr>
<th>Near-term</th>
<th>Medium-long term</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Grow fee revenue, with particular focus on higher quality recurring fees and data-driven pricing disciplines</td>
<td>- Disclose more – but be aware that this will give rise to scrutiny on underperforming parts of the business (e.g. lending)</td>
</tr>
<tr>
<td>- Dynamic and data-driven FTP and enhanced deposit pricing, including charging for negative yielding deposits</td>
<td>- Double down on B2C and C2B opportunities – e-commerce/platforms/merchant services – leveraging bank-wide capabilities not limited to the wholesale perimeter</td>
</tr>
<tr>
<td>- Increase cross-sell of linked-FX</td>
<td></td>
</tr>
<tr>
<td>- Optimise the balance sheet, increasing cross-sell between lending and payments and cash management; ration the deployment of lower return vanilla lending</td>
<td></td>
</tr>
</tbody>
</table>

**Scale players**
- Play for scale, leveraging partnerships to enhance and deliver propositions:
  - Banking as a Service (BaaS) ventures
  - Deep sector integration
- Renew technology backbone to deliver low cost, streamlined infrastructure

**Sub-scale players**
- Focus on client interface and areas of strength, e.g. deep local knowledge/connectivity
- Choose specific sectors to specialize in without playing everywhere, and win business through superior propositions
- Partner to enhance and deliver propositions
- Outsource core parts of your infrastructure where you don’t have sufficient scale, or create differentiation

Source: Oliver Wyman analysis.
Investors have underestimated the resilience and countercyclical earnings power of Markets and IBD franchises. Markets and IBD businesses have demonstrated their earnings power in periods of economic stress through the pandemic, delivering the best revenue and earnings performance in a decade and outperforming businesses that are more geared to the real economy. Markets and IBD revenues climbed 26% industrywide to $300BN in 2020, offsetting the decline in revenues in commercial (-5%) and consumer (-15%) banking businesses. The earnings shift was even more pronounced, with much higher increases in provisions for credit losses in commercial and consumer. We believe this performance is no fluke – Markets and IBD businesses have spent much of the past decade restructuring to build revenue and earnings resilience.

Second, Markets and IBD businesses have taken steps to transform their businesses, reducing their exposure to cyclical downturns in products such as credit and mortgage trading. While there will always be risk of losses from concentrated exposures or idiosyncratic events, Markets businesses are no longer as closely tied to the broad performance of the market (e.g. equity gains and losses, credit spreads widening and narrowing) through significant, directional inventory positions as they were during the Global Financial Crisis. Banks have reduced the overall size and increased the velocity of their inventory, benefiting from the shift to electronic trading and standardized, cleared markets. We estimate a dollar of revenue across the Markets and IBD perimeter now uses 21% less balance sheet and attracts 34% less VaR than 10 years ago.

There were two main factors driving the resilience of Markets and IBD revenues. One was certainly the extraordinary policy response to support the real economy and credit markets, which led to a rapid recovery in asset prices and reduced the risk of losses on inventory in credit and mortgage products. While economic conditions were exceptional in 2020, the use of Quantitative Easing and other types of formerly unconventional monetary policy have become an established part of the policy toolkit. Their deployment during future economic shocks may protect Markets and IBD businesses from Global Financial Crisis type downside risks.

As the industry has restructured, value has seeped from the sell-side to non-banks – but the shift in revenues has been slower than feared. New regulations introduced after the Global Financial Crisis shifted the economics of Markets and some IBD businesses by dramatically increasing capital requirements, reducing the attractiveness of previously high return businesses. Investors responded as the implied market value of Markets and IBD businesses fell to 3x revenues, whereas adjacent non-bank firms with low capital, network-like economics (e.g. exchanges, data providers) trade at P/E
Value has migrated to exchanges and financial data companies but the actual structural loss of revenues beneath this has been lower than feared.

### Exhibit 22:
Value has migrated to exchanges and financial data companies but the actual structural loss of revenues beneath this has been lower than feared.

<table>
<thead>
<tr>
<th>Market Cap / Revenue multiples with global bank spread, $BN 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Averages</strong></td>
</tr>
<tr>
<td>Revenues $BN</td>
</tr>
<tr>
<td>Revenue growth 2014-19</td>
</tr>
<tr>
<td>Market cap $BN</td>
</tr>
</tbody>
</table>

1. Market cap calculated as % of IBD & Markets revenue / total bank revenue multiplied by total bank market cap as of 3/10/2021. 2. Revenue includes revenue streams from Market Infrastructure and Financial Services activities only. Market cap is calculated as % of total revenue from these streams in 2020. Source: Coalition proprietary data, Refinitiv Datastream, Public earnings reports and corporate financial information, Oliver Wyman proprietary data, Oliver Wyman Analysis.

The winners are those best able to pivot towards the emerging drivers of value in the industry. Right now the biggest shifts have been towards electronic trading and private markets, and the leading players have already made big strides to pivot their models to these areas. Together these opportunities will account for over $75BN in revenues for the sell side. The battle is now on to carve out roles around the new drivers of value that will drive growth over the next 5 years — in particular around ESG and the Green transition, and around digital assets.

#### Value driver 1: Electronic trading.

- The sell-side has been under siege as non-bank liquidity providers, trading venues and market data providers take a bigger slice of the pie. 2020 saw a big acceleration in this trend, in credit products in particular. Yet 2020 also revealed the value in risk intermediation. The leading sell-side firms have invested to defend and adapt their model and we estimate the sell-side opportunity is >$50BN in revenue driven by electronic facilitation. The opportunity continues to evolve, as products once considered too illiquid to trade electronically move gradually toward more electronic execution. Corporate credit is the most recent example, with the rapid proliferation of algorithmic auto-pricing tools and portfolio trading over the past 2-3 years. Banks investing in cross-asset electronic trading infrastructure, building hybrid voice-electronic in less liquid asset classes, and developing innovative models for client service/access will have the edge.

#### Exhibit 23:

Markets and IBD businesses will need to capitalize on structural shifts in client demand to thrive in the future.

**Opportunities in Markets and IBD**

1. **Electronic trading**
   - Investing in electronic trading platforms that offer edge and scale across asset classes
   - Deep specialization in less liquid asset classes with hybrid electronic and high touch capabilities
   - Reassessment of the user interface (investing in client portals that create stickier relationships with investors with broad market access and value-added services)

2. **Private Markets**
   - Expand early-stage coverage and product offering for corporates staying private longer
   - Invest in platforms that can channel the wide range of financing options / solutions for private companies
   - Establish new fund structures and other vehicles for individual investors to access expanding universe of private investments
   - Invest in capital light services for private borrowers (transaction banking) or private markets investors (custody and fund admin)

3. **Emerging opportunities**
   - ESG: Financing the transition to a low carbon economy and underwriting a spectrum of green labelled products for investors
   - Digital Assets: trading and servicing new asset classes (e.g. crypto) and trading and servicing existing asset classes more efficiently
   - Outsourcing: commercializing existing capabilities, infrastructure, and data

**Market size**

1. Electronic trading: >$50 BN
2. Private Markets: >$25 BN
3. Emerging opportunities: N/A

Source: Oliver Wyman analysis, Morgan Stanley Research.
**Value driver 2: Private markets.** The rise of private markets is a threat to some traditional investment banking business - but also an opportunity for dealers able to pivot into this trend. We estimate the opportunity is >$25BN for Markets and IBD businesses. Opportunities include early-stage coverage, investing in financing capabilities/solutions for private companies, new fund structures for investors to access private investments, and capital light services such as Transaction Banking and custody and fund administration investors in private companies. Successful banks will capture the full value of IB capabilities and leverage groupwide client relationships and capabilities, such as in asset and wealth management.

**Value driver 3: Emerging growth markets.** Leading banks are also developing strategies now to best position themselves for the shifts that will define the medium to long term. These include:

- **ESG:** mobilizing innovative financing structures to fund key transition technologies and ecosystems (e.g. EVs, hydrogen), underwriting a spectrum of green labelled products for investors, developing carbon trading and risk management capabilities, connecting clients more efficiently to green supply chains, and advising and supporting clients in transition
- **Digital Assets:** trading and servicing new asset classes (e.g. crypto) and trading and servicing existing asset classes more efficiently
- **Outsourcing:** commercializing existing capabilities, infrastructure, and data, either through digital research offerings focused on proprietary insights or broader outsourcing and white-labeling capabilities in electronic trading, asset pricing, risk management, etc.

**Taken together this points to a constructive revenue outlook.** We expect revenues to normalize from 2020 over 2021-23 but to remain 10-11% above their pre-pandemic levels in our Full Recovery and Runaway Recovery scenarios. In the Full Recovery scenario revenues will remain elevated as global economies rebalance and the combination of fiscal stimulus and asset repricing generate demand for advisory, financing, intermediation, and risk management. In the Runaway Recovery scenario multiple rounds of fiscal stimulus supercharge the economy, sustaining momentum in the IPO/SPAC boom. The sharp and sustained rebound in the global economy and continued government backstop also sustain elevated earnings in Credit, though volatility normalizes quickly impacting flow businesses in outer years. Our Partial Recovery scenario sees policy makers pulling hard on fiscal and monetary levers – resulting in a low volatility but low economic activity environment that is challenging for flow businesses like Macro and Equities, but limits downside risk.

**Supervisors continue to demand more capital from these businesses.** US regulators have raised capital requirements in 2020 through the introduction of the Stress Capital Buffer. Banks that are Markets focused had average SCB requirements of 6.1% vs 2.8% for more diversified universals. While the SCB only applies in the US, it is indicative of the upwards pressure on capital requirements for Market and IBD businesses. By 2022 the Basel Committee on Banking Supervision is anticipated to have finalized the Fundamental Review of the Trading Book proposals, which will further raise market risk related capital requirements in the trading books of some banks. While trading businesses will always come with a degree of volatility, some banks may conclude that the level of capitalisation is now excessive relative to the risk exposure of these businesses. That in turn poses questions for these banks on how they effectively allocate capital internally across divisions to maximize group returns.
Scale and Innovation Drive Leaders and Laggards

With ROEs above hurdle rate, scale and capacity to innovate are key differentiators. 2020 demonstrated that banks are able to achieve high returns, with average returns across wholesale banks at 12%, above 2017-2019 levels of 9-10%. In our Full Recovery scenario, we anticipate banks achieving returns on average of 12% in 2023. Not all banks will achieve these above-hurdle returns however. Across wholesale banks we see cost-income ratios ranging from <60% to >70% for first-tier US banks and European banks, respectively. This is due in part to the scale benefits that US banks have already built up, and in part to the favourable macro conditions in the US versus the prolonged low interest rate environment in Europe. Scale challenges are even more stark in Transaction Banking, as described below. Given these factors, we estimate an ROE gap of 6% pts between leaders and laggards over the cycle.

Differentiators are particularly critical in the key battleground of Transaction Banking. Within the Transaction Banking business many regional players are struggling to cover the fixed cost base. Large global banks – particularly US and Asian players – enjoy significant advantages in terms of scale, commercial model and gearing to faster growth sectors of the market. US regionals enjoy sticky middle market client relationships, while the European regionals are most exposed. The range in cost-income ratios in Transaction Banking is significant, with many smaller banks and regional players at >90%, vs. global banks at <50%.

Exhibit 26:
Leaders and laggards RoE, 2023e
Historical and forecasted wholesale banking RoE by economic scenario, 2017-2023e

Exhibit 27:
Larger global banks continue to enjoy material scale advantages
Cash management cost-income – illustrative bank types

Note: Fixed costs comprising of technology costs; Stepped costs based on coverage, sales and direct costs; Variable costs based on Operations costs. Source: Coalition proprietary data, Oliver Wyman analysis.
Banks’ Payments and Cash Management fee margins have declined steadily over time due to a number of factors, including fee waivers driven by competitive pressure and a shift in the product mix towards lower fee products. This trend accelerated notably in 2020 with the rapid growth in e-commerce driving payments mix away from higher margin channels (like cheques), and increasing the volume of lower margin micro-payments.

**Exhibit 28:**
Banks’ fee margins have trended down recently as e-commerce has shifted volumes away from higher margin channels

<table>
<thead>
<tr>
<th>Year</th>
<th>Fee revenue</th>
<th>Fee margin Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2017</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>2018</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>2019</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>2020</td>
<td>77</td>
<td>77</td>
</tr>
</tbody>
</table>

1. All corporates with > $10MM turnover. 2. Payment volumes are calculated as the total of SWIFTNet FIN Payments Messages, CHIPS, CHAPS, BACS, UK Faster Payments, and Fedwire Funds Service volumes. | Source: Coalition proprietary data, SWIFT, BIS, FRB, The Clearing House, Bank of England CHAPS, Pay.UK, Oliver Wyman analysis.

As fee margins continue to trend downwards and new market structures create ‘winner takes all’ outcomes, smaller players will be increasingly disadvantaged. The cost of upgrading technology and product capabilities to meet new market standards – for example ISO20022 or domestic real-time payment schemes – may be prohibitively expensive for some.

**Yet we see opportunities for specialists.** Across all parts of wholesale, specialists who can go deep on particular sectors or activities can still deliver high return models:

- In the Markets and IBD business the top 6-8 banks have the depth of liquidity provision and breadth of capabilities across asset classes to outperform on industry ROE. Mid-sized challengers must focus on manufacturing scale in specialized asset classes or through serving clients on open platforms via partnerships.

- In Transaction Banking smaller banks will need to think about building group-wide payments hubs across retail, commercial and wholesale to maximize scale; outsourcing operations and technology services to lower cost providers; and focusing on areas of real strength, such as local market expertise and sector depth.

**Innovation is the wedge.** Looking ahead, winners will be determined by those that have invested in capabilities to successfully position for the medium to long-term structural shifts including BaaS business models, roll-out of central bank digital currencies and other digital assets, financing the transition to less carbon-intensive economies, and commercializing existing capabilities, infrastructure, and data. As banks pivot to follow these new structural shifts they will need to ensure their investments in innovation and change are efficient and effective. We estimate that 50% of change spend is wasted, in large part due to a lack of upfront planning, poor transparency, insufficient management buy-in, and tooth-less governance. To be successful in an environment that requires change, a disciplined approach to change management is often the difference between winners and losers.

If CIBs are to drive a re-rating by investors they will need to prove that there are sustainable revenue gains in previously underperforming Markets and IBD businesses and that they can achieve commercial excellence in Transaction Banking, deliver on ambitious growth plans, and improve disclosure. First tier banks will need to continue to drive home advantages of scale if they are to narrow the valuation gap with non-bank competitors. For the rest, tight discipline on costs and a focus on core strengths will be the clearest path to success.
Disclosure Section

The information and opinions in Morgan Stanley Research were prepared or are disseminated by Morgan Stanley Europe S.E., regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin) and/or Morgan Stanley & Co. International plc, authorized by the Prudential Regulatory Authority and regulated by the Financial Conduct Authority and the Prudential Regulatory Authority. Morgan Stanley & Co. International plc disseminates in the UK research that it has prepared, and approves solely for the purposes of section 21 of the Financial Services and Markets Act 2000, research which has been prepared by any of its affiliates. As used in this disclosure section, Morgan Stanley includes RMB Morgan Stanley Proprietary Limited, Morgan Stanley Europe S.E., Morgan Stanley & Co International plc and its affiliates.

For important disclosures, stock price charts and equity rating histories regarding companies that are the subject of this report, please see the Morgan Stanley Research Disclosure Website at www.morganstanley.com/researchdisclosures, or contact your investment representative or Morgan Stanley Research at 1585 Broadway, (Attention: Research Management), New York, NY, 10036 USA.

For valuation methodology and risks associated with any recommendation, rating or price target referenced in this research report, please contact the Client Support Team as follows: US/Canada +1 800 303-2495; Hong Kong +852 2848-5999; Latin America +1 718 754-5444 (U.S.); London +44 (0)20-7425-8169; Singapore +65 6834-6860; Sydney +61 (0)2-9770-1505; Tokyo +81 (0)3-6836-9000. Alternatively you may contact your investment representative or Morgan Stanley Research at 1585 Broadway, (Attention: Research Management), New York, NY 10036 USA.

Analyst Certification

The following analysts hereby certify that their views about the companies and their securities discussed in this report are accurately expressed and that they have not received and will not receive direct or indirect compensation in exchange for expressing specific recommendations or views in this report: Izabel Dobreva; Manos Gosalia; Betsy L. Graseck, CFA; Nida Iqbal; Ryan Kenny; Nick Lord; Giulia Aurora Miotto, CFA; Mia Nagasaka; Alvaro Serrano; Magdalena L Stoklosa, CFA; Ken A Zerbe, CFA.

Unless otherwise stated, the individuals listed on the cover page of this report are research analysts.

Global Research Conflict Management Policy

Morgan Stanley Research has been published in accordance with our conflict management policy, which is available at www.morganstanley.com/institutional/research/conflictpolicies. A Portuguese version of the policy can be found at www.morganstanley.com.br

Important Regulatory Disclosures on Subject Companies

The equity research analysts or strategists principally responsible for the preparation of Morgan Stanley Research have received compensation based upon various factors, including quality of research, investor client feedback, stock picking, competitive factors, firm revenues and overall investment banking revenues. Equity Research analysts’ or strategists’ compensation is not linked to investment banking or capital markets transactions performed by Morgan Stanley or the profitability or revenues of particular trading desks.

Morgan Stanley and its affiliates do business that relates to companies/instruments covered in Morgan Stanley Research, including market making, providing liquidity, fund management, commercial banking, extension of credit, investment services and investment banking. Morgan Stanley sells to and buys from customers the securities/instruments of companies covered in Morgan Stanley Research on a principal basis. Morgan Stanley may have a position in the debt of the Company or instruments discussed in this report. Morgan Stanley trades or may trade as principal in the debt securities (or in related derivatives) that are the subject of the debt research report.

Certain disclosures listed above are also for compliance with applicable regulations in non-US jurisdictions.

STOCK RATINGS

Morgan Stanley uses a relative rating system using terms such as Overweight, Equal-weight, Not-Rated or Underweight (see definitions below). Morgan Stanley does not assign ratings of Buy, Hold or Sell to the stocks we cover. Overweight, Equal-weight, Not-Rated and Underweight are not the equivalent of buy, hold and sell. Investors should carefully read the definitions of all ratings used in Morgan Stanley Research. In addition, since Morgan Stanley Research contains more complete information concerning the analyst’s views, investors should carefully read Morgan Stanley Research, in its entirety, and not infer the contents from the rating alone. In any case, ratings (or research) should not be used or relied upon as investment advice. An investor’s decision to buy or sell a stock should depend on individual circumstances (such as the investor’s existing holdings) and other considerations.

Global Stock Ratings Distribution

(as of March 31, 2021)

The Stock Ratings described below apply to Morgan Stanley’s Fundamental Equity Research and do not apply to Debt Research produced by the Firm.

For disclosure purposes only (in accordance with FINRA requirements), we include the category headings of Buy, Hold, and Sell alongside our ratings of Overweight, Equal-weight, Not-Rated and Underweight. Morgan Stanley does not assign ratings of Buy, Hold or Sell to the stocks we cover. Overweight, Equal-weight, Not-Rated and Underweight are not the equivalent of buy, hold, and sell but represent recommended relative weightings (see definitions below).

To satisfy regulatory requirements, we correspond Overweight, our most positive stock rating, with a buy recommendation; we correspond Equal-weight and Not-Rated to hold and Underweight to sell recommendations, respectively.
Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the % of total column may not add up to exactly 100 percent.

### Analyst Stock Ratings

**Overweight (O).** The stock's total return is expected to exceed the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

**Equal-weight (E).** The stock's total return is expected to be in line with the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

**Not-Rated (NR).** Currently the analyst does not have adequate conviction about the stock's total return relative to the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

**Underweight (U).** The stock's total return is expected to be below the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Unless otherwise specified, the time frame for price targets included in Morgan Stanley Research is 12 to 18 months.

### Analyst Industry Views

**Attractive (A):** The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be attractive vs. the relevant broad market benchmark, as indicated below.

**In-Line (I):** The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be in line with the relevant broad market benchmark, as indicated below.

**Cautious (C):** The analyst views the performance of his or her industry coverage universe over the next 12-18 months with caution vs. the relevant broad market benchmark, as indicated below.

Benchmarks for each region are as follows: North America - S&P 500; Latin America - relevant MSCI country index or MSCI Latin America Index; Europe - MSCI Europe; Japan - TOPIX; Asia - relevant MSCI country index or MSCI sub-regional index or MSCI AC Asia Pacific ex Japan Index.

### Important Disclosures for Morgan Stanley Smith Barney LLC & E*TRADE Securities LLC Customers

Important disclosures regarding the relationship between the companies that are the subject of Morgan Stanley Research and Morgan Stanley Smith Barney LLC or Morgan Stanley or any of their affiliates, are available on the Morgan Stanley Wealth Management disclosure website at www.morganstanley.com/online/researchdisclosures. For Morgan Stanley specific disclosures, you may refer to www.morganstanley.com/researchdisclosures.

Each Morgan Stanley research report is reviewed and approved on behalf of Morgan Stanley Smith Barney LLC and E*TRADE Securities LLC. This review and approval is conducted by the same person who reviews the research report on behalf of Morgan Stanley. This could create a conflict of interest.

### Other Important Disclosures

Morgan Stanley Research policy is to update research reports as and when the Research Analyst and Research Management deem appropriate, based on developments with the issuer, the sector, or the market that may have a material impact on the research views or opinions stated therein. In addition, certain Research publications are intended to be updated on a regular periodic basis (weekly/monthly/quarterly/annual) and will ordinarily be updated with that frequency, unless the Research Analyst and Research Management determine that a different publication schedule is appropriate based on current conditions. Morgan Stanley is not acting as a municipal advisor and the opinions or views contained herein are not intended to be, and do not constitute, advice within the meaning of Section 975 of the Dodd-Frank Wall Street Reform and Consumer Protection Act.
Morgan Stanley produces an equity research product called a “Tactical Idea.” Views contained in a “Tactical Idea” on a particular stock may be contrary to the recommendations or views expressed in research on the same stock. This may be the result of differing time horizons, methodologies, market events, or other factors. For all research available on a particular stock, please contact your sales representative or go to Matrix at http://www.morganstanley.com/matrix.

Morgan Stanley Research is provided to our clients through our proprietary research portal on Matrix and also distributed electronically by Morgan Stanley to clients. Certain, but not all, Morgan Stanley Research products are also made available to clients through third-party vendors or redistributed to clients through alternate electronic means as a convenience. For access to all available Morgan Stanley Research, please contact your sales representative or go to Matrix at http://www.morganstanley.com/matrix.

Any access and/or use of Morgan Stanley Research is subject to Morgan Stanley's Terms of Use (http://www.morganstanley.com/terms.html). By accessing and/or using Morgan Stanley Research, you are indicating that you have read and agree to be bound by our Terms of Use (http://www.morganstanley.com/terms.html). In addition you consent to Morgan Stanley processing your personal data and using cookies in accordance with our Privacy Policy and our Global Cookies Policy (http://www.morganstanley.com/privacy_pledge.html), including for the purposes of setting your preferences and to collect readership data so that we can deliver better and more personalized service and products to you. To find out more information about how Morgan Stanley processes personal data, how we use cookies and how to reject cookies see our Privacy Policy and our Global Cookies Policy (http://www.morganstanley.com/privacy_pledge.html).

If you do not agree to our Terms of Use and/or if you do not wish to provide your consent to Morgan Stanley processing your personal data or using cookies please do not access our research.

Morgan Stanley Research does not provide individually tailored investment advice. Morgan Stanley Research has been prepared without regard to the circumstances and objectives of those who receive it. Morgan Stanley recommends that investors independently evaluate particular investments and strategies, and encourages investors to seek the advice of a financial adviser. The appropriateness of an investment or strategy will depend on an investor’s circumstances and objectives. The securities, instruments, or strategies discussed in Morgan Stanley Research may not be suitable for all investors, and certain investors may not be eligible to purchase or participate in some or all of them. Morgan Stanley Research is not an offer to buy or sell or the solicitation of an offer to buy or sell any security/instrument or to participate in any particular trading strategy. The value of and income from your investments may vary because of changes in interest rates, foreign exchange rates, default rates, prepayment rates, securities/instruments prices, market indexes, operational or financial conditions of companies or other factors. There may be time limitations on the exercise of options or other rights in securities/instruments transactions. Past performance is not necessarily a guide to future performance. Estimates of future performance are based on assumptions that may not be realized. If provided, and unless otherwise stated, the closing price on the cover page is that of the primary exchange for the subject company's securities/instruments.

The fixed income research analysts, strategists or economists principally responsible for the preparation of Morgan Stanley Research have received compensation based upon various factors, including quality, accuracy and value of research, firm profitability or revenues (which include fixed income trading and capital markets profitability or revenues), client feedback and competitive factors. Fixed Income Research analysts', strategists' or economists' compensation is not linked to investment banking or capital markets transactions performed by Morgan Stanley or the profitability or revenues of particular trading desks.

The "Important Regulatory Disclosures on Subject Companies" section in Morgan Stanley Research lists all companies mentioned where Morgan Stanley owns 1% or more of a class of common equity securities of the companies. For all other companies mentioned in Morgan Stanley Research, Morgan Stanley may have an investment of less than 1% in securities/instruments or derivatives of securities/instruments of companies and may trade them in ways different from those discussed in Morgan Stanley Research. Employees of Morgan Stanley not involved in the preparation of Morgan Stanley Research may have investments in securities/instruments or derivatives of securities/instruments of companies mentioned and may trade them in ways different from those discussed in Morgan Stanley Research. Derivatives may be issued by Morgan Stanley or associated persons.

With the exception of information regarding Morgan Stanley, Morgan Stanley Research is based on public information. Morgan Stanley makes every effort to use reliable, comprehensive information, but we make no representation that it is accurate or complete. We have no obligation to tell you when opinions or information in Morgan Stanley Research change apart from when we intend to discontinue equity research coverage of a subject company. Facts and views presented in Morgan Stanley Research have not been reviewed by, and may not reflect information known to, professionals in other Morgan Stanley business areas, including investment banking personnel.

Morgan Stanley Research personnel may participate in company events such as site visits and are generally prohibited from accepting payment by the company of associated expenses unless pre-approved by authorized members of Research management.

Morgan Stanley may make investment decisions that are inconsistent with the recommendations or views in this report.
To our readers based in Taiwan or trading in Taiwan securities/instruments: Information on securities/instruments that trade in Taiwan is distributed by Morgan Stanley Taiwan Limited ("MSTL"). Such information is for your reference only. The reader should independently evaluate the investment risks and is solely responsible for their investment decisions. Morgan Stanley Research may not be distributed to the public media or quoted or used by the public media without the express written consent of Morgan Stanley. Any non-customer reader within the scope of Article 7-1 of the Taiwan Stock Exchange Recommendation Regulations accessing and/or receiving Morgan Stanley Research is not permitted to provide Morgan Stanley Research to any third party (including but not limited to related parties, affiliated companies and any other third parties) or engage in any activities regarding Morgan Stanley Research which may create or give the appearance of creating a conflict of interest. Information on securities/instruments that do not trade in Taiwan is for informational purposes only and is not to be construed as a recommendation or a solicitation to trade in such securities/instruments. MSTL may not execute transactions for clients in these securities/instruments.

Morgan Stanley is not incorporated under PRC law and the research in relation to this report is conducted outside the PRC. Morgan Stanley Research does not constitute an offer to sell or the solicitation of an offer to buy any securities in the PRC. PRC investors shall have the relevant qualifications to invest in such securities and shall be responsible for obtaining all relevant approvals, licenses, verifications and/or registrations from the relevant governmental authorities themselves. Neither this report nor any part of it is intended as, or shall constitute, provision of any consultancy or advisory service of securities investment as defined under PRC law. Such information is provided for your reference only.

Morgan Stanley Research is disseminated in Brazil by Morgan Stanley C.T.V.M. S.A. located at Av. Brigadeiro Faria Lima, 3600, 6th floor, São Paulo - SP, Brazil, and is regulated by the Comissão de Valores Mobiliários; in Mexico by Morgan Stanley México, Casa de Bolsa, S.A. de C.V which is regulated by Comision Nacional Bancaria y de Valores, Paseo de los Tamarindos 90, Torre 1, Col. Bosques de las Lomas Floor 29, 05120 Mexico City, in Japan by Morgan Stanley MUFG Securities Co., Ltd. and, for Commodities related research reports only, Morgan Stanley Capital Group Japan Co., Ltd; in Hong Kong by Morgan Stanley Asia Limited (which accepts responsibility for its contents) and by Morgan Stanley Asia International Limited, Hong Kong Branch; in Singapore by Morgan Stanley Asia (Singapore) Pte (Registration number 1992062982) and/or Morgan Stanley Asia (Singapore) Securities Pte Ltd (Registration number 2000008434), regulated by the Monetary Authority of Singapore (which accepts legal responsibility for its contents and should be contacted with respect to any matters arising from, or in connection with, Morgan Stanley Research) and by Morgan Stanley Asia International Limited, Singapore Branch (Registration number T1FC0207F); in Australia to ‘wholesale clients’ within the meaning of the Australian Corporations Act by Morgan Stanley Australia Limited A.B.N. 67 003 734 576; holder of Australian financial services license No. 233742, which accepts responsibility for its contents; in Australia to ‘wholesale clients’ and “retail clients” within the meaning of the Australian Corporations Act by Morgan Stanley Wealth Management Australia Pty Ltd (A.B.N. 19 009 745 555, holder of Australian financial services license No. 240813, which accepts responsibility for its contents; in Korea by Morgan Stanley & Co International plc, Seoul Branch; in India by Morgan Stanley India Company Private Limited; in Indonesia by PT. Morgan Stanley Sekuritas Indonesia; in Canada by Morgan Stanley Canada Limited, which has approved of and takes responsibility for its contents in Canada; in Germany and the European Economic Area where required by Morgan Stanley Europe S.E., authorised and regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin) under the reference number 149169; in the US by Morgan Stanley & Co. LLC, which accepts responsibility for its contents. Morgan Stanley & Co. International plc, authorized by the Prudential Regulatory Authority and regulated by the Financial Conduct Authority and the Prudential Regulatory Authority, disseminates in the UK research that it has prepared, and approves solely for the purposes of section 21 of the Financial Services and Markets Act 2000, research which has been prepared by any of its affiliates. RMB Morgan Stanley Proprietary Limited is a member of the JSE Limited and A2X (Pty) Ltd. RMB Morgan Stanley Proprietary Limited is a joint venture owned equally by Morgan Stanley International Holdings Inc. and RMB Investment Advisory (Proprietary) Limited, which is wholly owned by FirstRand Limited. The information in Morgan Stanley Research is being disseminated by Morgan Stanley Saudi Arabia, regulated by the Capital Market Authority in the Kingdom of Saudi Arabia, and is directed at Sophisticated investors only.

Morgan Stanley Hong Kong Securities Limited is the liquidity provider/market maker for securities of HSBC listed on the Stock Exchange of Hong Kong Limited. An updated list can be found on HKEx website: http://www.hkex.com.hk.

The information in Morgan Stanley Research is being communicated by Morgan Stanley & Co. International plc (DIFC Branch), regulated by the Dubai Financial Services Authority (the DFSA), and is directed at Professional Clients only, as defined by the DFSA. The financial products or financial services to which this research relates will only be made available to a customer who we are satisfied meets the regulatory criteria to be a Professional Client. The information in Morgan Stanley Research is being communicated by Morgan Stanley & Co. International plc (QFC Branch), regulated by the Qatar Financial Centre Regulatory Authority (the QFCRA), and is directed at business customers and market counterparties only and is not intended for Retail Customers as defined by the QFCRA.

As required by the Capital Markets Board of Turkey, investment information, comments and recommendations stated here, are not within the scope of investment advisory activity. Investment advisory service is provided exclusively to persons based on their risk and income preferences by the authorized firms. Comments and recommendations stated here are general in nature. These opinions may not fit to your financial status, risk and return preferences. For this reason, to make an investment decision by relying solely to this information stated here may not bring about outcomes that fit your expectations.