Low Balance Lending Economics: The Role of the Spec Pay-up

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Background

At Fannie Mae, our mission is to facilitate sustainable access to homeownership by providing liquidity for home mortgages, including those to credit-worthy lower-income borrowers. Such borrowers tend to purchase less expensive homes and, consequently, require smaller mortgage loans, underscoring the critical nature of small balance mortgage lending.[1, 2] While attention is increasingly being paid to the importance of low-balance loans more broadly, the secondary market dynamics that facilitate this lending activity are not well understood.[3]

A central feature of the GSE MBS market is the TBA (To-Be-Announced) security and the liquidity and certainty that it provides lenders originating conforming loans. The ability to lock pricing before specific loan attributes are finalized is a fundamental attribute of Agency MBS that allows lenders to originate lower mortgage rates than would be possible if they were exposed to market volatility during the entire underwriting process. A less well-understood dynamic, but crucial component of secondary market revenue for lenders on low balance loans is the premium investors are sometimes willing to pay when these loans are securitized in a mortgage-backed security (MBS). Such premiums, referred to by capital market participants as specified ("spec") pool pay-ups, are paid relative to the TBA price and typically emerge because certain attributes differentiate the expected prepayment behavior.

In this working paper, we leverage unique data to develop a new analytical methodology that generates estimates of lender revenue for Fannie Mae guaranteed loans. These estimates facilitate noteworthy insights into the relationship between individual loan economics and origination patterns. Among these new insights, we particularly focus on the role the spec pay-up plays in the secondary mortgage market to improve underwriting economics for lenders, in turn improving support for traditionally underserved segments, such as low balance/lower income borrowers, who would otherwise receive less credit and/or higher mortgage rates.

Prior Research

Prior research in this space focuses on: the challenges of low-balance mortgage lending in the primary market (Fratantoni et al 2023, Maguze et al 2023; McCargo et al 2018); liquidity and cost tradeoffs between To-Be-Announced (TBA) and spec pool securities in the secondary market (Vickery and Wright 2013; Gao, Schultz, Song 2017); the role of TBA-eligibility in reducing primary market mortgage note rates (Huh and Kim 2022); or lender business models, such as origination costs, lender intermediation markups and interest rate pass-throughs, particularly during periods of capacity constraints (Chen et al 2021; D'Acunto and Rossi 2022; Fuster et al 2017, 2021). While this literature explains why lenders are disincentivized from focusing on lower balance loans (e.g., higher origination and secondary market trading costs, loan officer compensation incentives, and lender capacity constraints), proposed solutions generally focus on increasing housing supply, improving underwriting efficiencies, closing costs, or revising loan officer compensation or other regulations (Agarwal et al 2021; McCargo et al 2018; Huh and Kim 2023; Sharpe and Sherlund 2016; Zainulbhai et al 2021). To our knowledge, there is no substantial research into how secondary market economics contribute to making it more viable for lenders to originate these loans.

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[1] Low balance lending has varying definitions depending on the context. In the academic and policy literature focused on lower income borrowers, the emphasis has been on loans made at varying thresholds below $150k (Maguze et al 2023; McCargo et al 2018). On the other hand, the finance literature typically uses higher cutoffs (e.g., Huh and Kim 2023 use $175k) or allows a flexible cutoff that mirrors the secondary mortgage market, where low balance has generally referred to loans below $250k (e.g., Gao et al 2017). In the secondary market, loans are pooled separately into specified MBS pools with varying maximum balance cut-offs (e.g., 85k, 115k, 125k, etc.) and traded with a pay-up to TBA. However, the largest low loan balance spec story currently traded widely ($250k max), is not a set cutoff. The threshold is determined by the market (based on prepayment characteristics) and has been increasing along with home prices. More recently, $275k max pools have started to trade. In this paper, we use the term low balance in line with the latter market definition since the discussion focuses on the broader impact of spec pay-ups. For more information on the dynamics of spec pool lending, as well as the composition of spec pool borrowers and lenders, please refer to the Appendix.

[2] For example, approximately 47% of loans under $250k issued in Fannie Mae's MBS in 2022 were to borrowers with income at or below 80% of Area-Median-Income (AMI) for 30-year fixed-rate MBS (i.e., CL prefix). Conversely, only 14% of borrowers with loans above $250k were at or below the same AMI threshold.

[3] In its recent RFI, which seeks information on increasing access to smaller balance mortgages, HUD acknowledges that consideration needs to be given to the ways the secondary market can incentivize or subsidize small mortgage lending (HUD Office of Policy Development and Research 2022).

Origination Costs

Lenders incur various costs (both fixed and variable) when originating loans which can largely be sorted into two categories. The first category of costs relate directly to *mortgage production* (loan officer, underwriter, and compliance salaries; as well as rent, equipment, and advertising). The second category of costs are related to *risk management*. These include the costs associated with pipeline hedging (due to the time lag between the mortgage rate lock and secondary market delivery) and the risk of putbacks, which arise from a lender's obligation to buy back a loan for violating GSE underwriting guidelines.[4] Additional costs may arise from idiosyncratic business decisions. For example, lenders may invest in technology enhancements, which may yield cost savings elsewhere, in addition to improving the customer experience. The mortgage lending industry is a competitive market, and to the extent possible, lenders attempt to compete on cost to buffer profitability.

While costs influence lender behavior to some extent, the remainder of this paper focuses on developing an understanding for what drives the revenue side of the equation. Specifically, we demonstrate why revenue, not cost, is the principal driver of lender behavior and explain why the existence of the spec pay-up is critical for making lower balance lending economical in light of this behavior.

Spec Pool Overview

A spec pool is an MBS where all loans in the pool meet a specified criteria at issuance, and these characteristics are known at the time of the trade. These pools can be identified using any criteria available in public disclosures (e.g., loan size, state, loan-to-value, FICO, etc.). Investor appetite determines the nature of spec pools issued and is generally driven by prepayment expectations. Advantageous prepayment behavior may justify a premium (i.e., pay-up) relative to the TBA deliverable, which is generally determined by pools with the worst prepayment characteristics.[5]

As discussed in Fabozzi (2016), when loans are in-the-money to refinance (i.e., the prevailing mortgage rate is *lower* than most borrowers' current mortgage rate), investors prefer slower prepayments. Conversely, when loans are out-of-the-money (i.e., the prevailing mortgage rate is *higher* than the majority of borrowers' current mortgage rate), which is the case for most loans today, investors prefer faster paying loans.

Brevoort (2022) and Fabozzi (2016) highlight that lower balance loans tend to refinance at slower rate than higher balance loans when in-the-money for a number of reasons, including that refinance costs for borrowers are relatively fixed across loan size, which leads to smaller dollar savings for the same rate incentive level compared to larger loans. When out-of-the-money, lower balance loans exhibit faster prepay speeds as they tend to be "move-up" buyers. In both cases, investors are willing to pay more for bonds containing loans that exhibit these behaviors.

Lender Revenue Estimation Methodology

To better understand how spec pool pay-ups facilitate low balance lending, we have developed a new methodology that decomposes the elements of loan-level lender revenue. This Lender Revenue Estimation ("LRE") methodology leverages internal and external data sources to estimate originator revenue per loan. We do this by combining known loan-level elements with assumptions of secondary market execution-level economics based on our experience as an active market maker. The methodology breaks out lender revenue into four main components: **Origination**, **Base Servicing**, Margin, and **Pay-up**. Margin can be further broken down into two subcomponents, which bifurcate *par* gain-on-sale (**Base Margin**) from *surplus* gain-on-sale (**Additional Margin**), allowing us to determine whether lenders are subsidizing business (accepting a negative Additional Margin) or earning additional revenue (receiving a positive Additional Margin).

Figure 1 provides a stylized example of how the methodology calculation works at the loan level, using data from the recent refi wave (2021), when pay-ups were relatively high. The mortgage rate is first decomposed into its various components in column i (i.e., base margin, additional margin, and base servicing), which are then converted into upfront points (column iii) using market

[4] For more detail on these costs, see Fuster et al (2013, 2017) and the MBA Quarterly Mortgage Bankers Performance Report.

[5] For more information on pay-ups, see Fabozzi 2016.

multiples (column ii). This amount, which reflects a *percentage* of loan size, is then converted to upfront dollar terms (column v) by multiplying by the size of the loan (column iv). This last step in the calculation illustrates the considerable sensitivity of revenue to loan size.

Origination and pay-up revenue are added to these three components to calculate total revenue. Pay-up revenue is quoted in points, which is consistent with market convention, while origination revenue is displayed in upfront dollar terms.

In this example, the base margin for the $400k loan and the $110k loan is identical in upfront percentage point terms (i.e., 2.25%). However, because of the loan size difference, the upfront dollar base margin is substantially different between the two (i.e., $9k vs ~$2.5k). A similar dynamic exists for the base servicing revenue. We provide more detailed information on the data, our assumptions, and the calculations for the LRE in the Appendix.

Figure 1:

Example Loan-Level Calculation

Current Coupon Approach

= Assumption
= Data point
= Calculation

	Revenue Components	Loan 1 Rate (i)	Loan 1 Multiple (ii)	Loan 1 Upfront Points (iii = I x ii)	Loan 1 Loan Size (iv)	Loan 1 Upfront Dollars (v = iii x iv)	Loan 1 Revenue Component	Loan 2 Rate (i)	Loan 2 Multiple (ii)	Loan 2 Upfront Points (iii = I x ii)	Loan 2 Loan Size (iv)	Loan 2 Upfront Dollars (v = iii x iv)	Loan 2 Revenue Component
	Origination-Related												
	Origination Fees, Brokers Fees, etc.					$ 2,160	Origination					$ 2,160	Origination
	Secondary Marketing												
(A)	Current Coupon Yield	1.86%						1.86%					
(B)	Gfee	0.44%						0.44%					
(C)	Sfee (Base)	0.25%	4	1.00%	$400k	$ 4,000	Base Servicing	0.25%	4	1.00%	$110k	$ 1,100	Base Servicing
(D) = (A) + (B) + (C)	Breakeven Note Rate	2.55%						2.55%					
(E)	Par Mortgage Rate (e.g., Optimal Blue)	3.00%						3.00%					
(F) = (E) - (D)	Base Margin	0.45%	5	2.25%	$400k	$ 9,000	Base Margin	0.45%	5	2.25%	$110k	$ 2,475	Base Margin
(G)	Borrower Note Rate (adj for points/LLPAs)	3.00%						3.25%					
(H) = (G) - (E)	Additional Margin/Cost for Par	0.00%	5	0.00%	$400k	$ 0	Addtl Margin	0.25%	5	1.25%	$110k	$ 1,375	Addtl Margin
(I)	Payup			0.00%	$400k	$ 0	Payup			1.88%	$110k	$ 2,068	Payup
(C) + (F) + (H) + (I)	Total Revenue					$ 15,160						$ 9,178	

Loan 1: Loan Size = $400k

Loan 2: Loan Size = $110k

**The values used in this example are for illustrative purposes only. For more information into these calculations and the relevant assumptions, see the Appendix.*

Comparison with Traditional Gain on Sale Representation

In light of the novel nature of the LRE methodology, we compare its decomposition of margin with a more traditional view (i.e., market gain-on-sale). Practitioners often use the Primary-Secondary Spread (PSS) as a quick proxy for originator profit. In the academic literature, this approach is refined by subtracting the base servicing (i.e., servicer revenue) and guarantee fee (g-fee, the GSE revenue) from the PSS to more precisely approximate lender revenue (also called margin or gain-on-sale) (Begley and Palim 2023; Fuster et al 2013, 2021).

$$\boldsymbol{Lender\ Gain\ on\ Sale} = Primary\ Secondary\ Spread - Sfee - Gfee$$

Using this construct, the borrower's note rate can be decomposed as follows (Begley and Palim 2023), where CCY represents the Current Coupon Yield (i.e., the theoretical yield on the par ($100) priced FNCL[6] TBA):

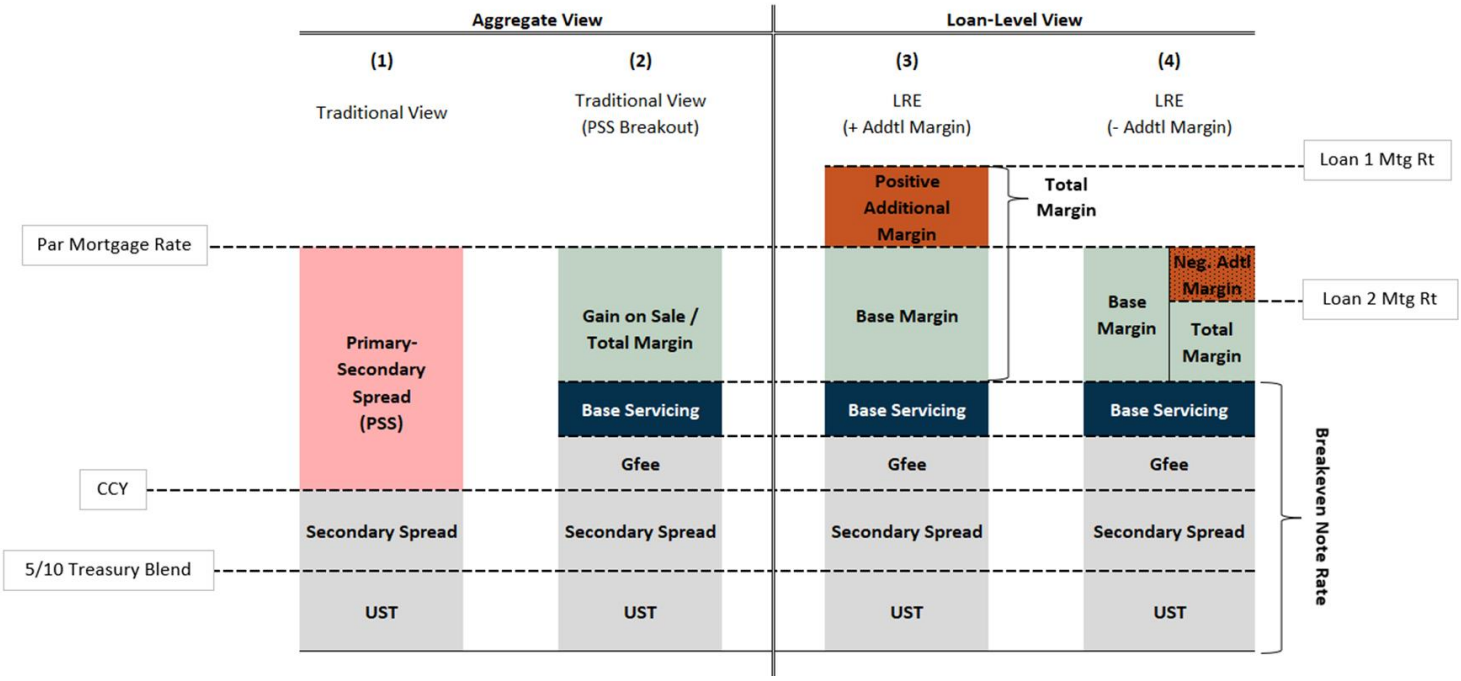
$$\boldsymbol{Gross\ Note\ Rate} = CCY + Sfee + Gfee + Lender\ Gain\ on\ Sale$$

[6] 'CL' is a prefix identifier which indicates MBS pools composed of long-term, level-payment single-family, conventional mortgages that mature or are due in 30 years or less. The CL prefix represents the vast majority of Fannie MBS issuance. For more information on pool prefixes, see the Fannie Mae Pool Prefix Glossary.

We consider two examples to demonstrate how the LRE further decomposes this view (i.e., PSS) at the loan level, as shown in ***Figure 2*** below. The PSS is used as a general proxy for lender gain-on-sale but does not account for loan-level variations in revenue. The second column illustrates the traditional view of lender revenue in more detail, where the analyst separates out the Base Servicing fee (25 basis points (bps)) and the loan-level fee charged by a GSE for guaranteeing the timely payment of principal and interest to the MBS investor (gfee) when deriving their estimate of lender revenue.

Next, we apply the LRE methodology to two different loans to illustrate the additional insight that this approach provides. For Loan 1 (third column), the borrower's mortgage rate is *higher* than the par rate at that point in time. Thus, the lender's total margin on this loan is higher compared to the market view (i.e., in the LRE, the lender makes the **Additional Margin** *in addition* to the **Base Margin**, which is equal to the market-implied **Gain on Sale** from column 2). On the other hand, for Loan 2 (fourth column), the borrower's mortgage rate is *below* the par rate, meaning that the lender "receives" *negative* **Additional Margin**. Said differently, the total margin for this loan is equal to base margin less the additional margin, which pushes the lender's **Base Margin** lower than the industry **Gain on Sale** measure from column 2.

Figure 2: **Illustrative Comparison of LRE to Traditional Market View**



Note that this comparison isolates the margin component and does not address other components of revenue measured by the LRE such as base servicing or the pay-up.

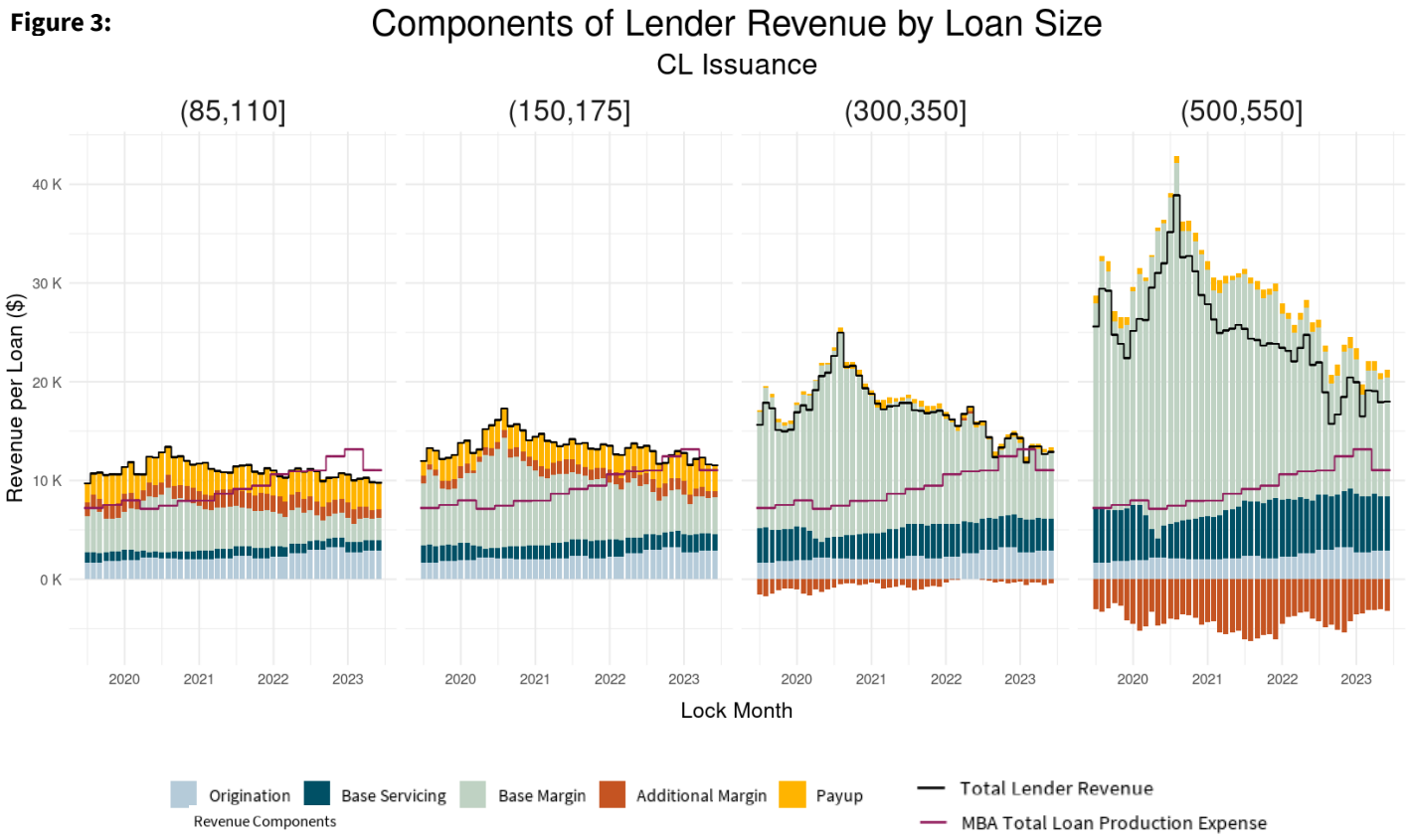
Initial Insights from LRE

The LRE methodology applied to our unique data allows us to demonstrate two concepts that are well understood by market participants but have not yet been documented empirically in the academic or practitioner literature:

(1) High balance lending is substantially more profitable on a dollar basis than lower balance lending. This is the difference between the **revenue** (average estimated per-loan revenue for each category) and **cost** (industry average cost per-loan) lines across the four panels in ***Figure 3*** (which shows the LRE for Fannie CL issuance over time, broken out by loan size bucket), and

(2) Originators compete aggressively for this more profitable business (as seen in the *negative* **Additional Margin** for the larger loan size buckets in ***Figure 3***). This pattern is particularly evident in times when demand for loans exceeds industry capacity, such as during the heavy refinance market from 2020-2022 (visible in the charts).

Figure 3:



Source(s): Lender Revenue Estimation Methodology (see Figure 7 in the Appendix for complete list of sources); MBA Mortgage Bankers Performance Report

Although some costs vary with loan size, lender *revenue* per-loan tends to be significantly more sensitive to loan size than total per-loan origination *costs*.[7] Dollar revenue is especially sensitive to loan size because it is proportional to the gain-on-sale margin earned when selling a loan to the secondary market (as illustrated in ***Figure 1***).[8] Consequently, originators tend to originate a relatively higher share of higher balance loans in capacity-constrained environments compared to during periods of excess capacity. Such loans tend to be made to higher income borrowers who face fewer barriers to obtaining mortgage credit. This might suggest that there is a greater likelihood of originators focusing on lower balance lending when they have surplus capacity, such as when mortgage rates increase dramatically, as seen in recent months.

[7] As discussed in the *Limitations* section of the appendix, we assume costs are fixed across loan size for the purpose of this analysis.

[8] The primary source of revenue for lenders selling loans into the secondary market is the gain-on-sale margin. That is, lenders generally receive a premium in excess of the loan proceeds provided to the borrower, minus the guarantee fee (and servicing fee, which is generally accounted for as a separate component of revenue). This spread is built into the mortgage rate offered by lenders when building out their rate sheets. Conversations surrounding the viability of low balance lending sometimes disproportionally focus on Loan Officer (LO) behavior, which is positively correlated with loan size. However, LO compensation is a cost from the lender's perspective. The fundamental reason larger loans are more profitable for lenders (and thus receive more attention) is because their revenue is proportional to this gain-on-sale margin (i.e., price received from market minus amount disbursed to the borrower, multiplied by loan size). Although both LO compensation (a cost to the lender) and gain-on-sale margin (revenue for the lender) are positively correlated with loan size, Fratantoni et al (2023) find that revenue is significantly more sensitive to loan size than costs (of which LO comp is the principal variable cost). Other research on these dynamics includes: D'Acunto and Rossi (2022); Huh and Kim (2022); Maguze et al (2023); McCargo et al (2018); and Mota and Palim (2021).

To illustrate this dynamic, we contrast two periods: one where the mortgage industry experienced significant capacity constraints (**Q3 2020**) and another with excess capacity (**Q4 2022**). ***Figure 4*** compares the loan size distribution of Fannie 30-year CL issuance during these two periods, adjusting for home price changes, and demonstrates that lenders are originating relatively larger loans in the capacity constrained environment.

Figure 4:

Loan Size Distribution of Fannie Issuance (Adjusted for HPA) by Originator Capacity

30-Year TBA Eligible Loans Locked in Q3 2020 and Q4 2022

	Share of Loans		
Loan Size Bucket HPA Adjusted*	**Capacity Constrained Period** Q3 2020	**Period of Excess Capacity** Q4 2022	**Difference** Q4 2022 - Q3 2020
Up to $125k	10.8%	20.9%	10.1%
$125k to $250k	39.6%	44.0%	4.4%
$250k to $500k	46.3%	32.7%	-13.5%
$500k to $750k	3.3%	2.4%	-1.0%

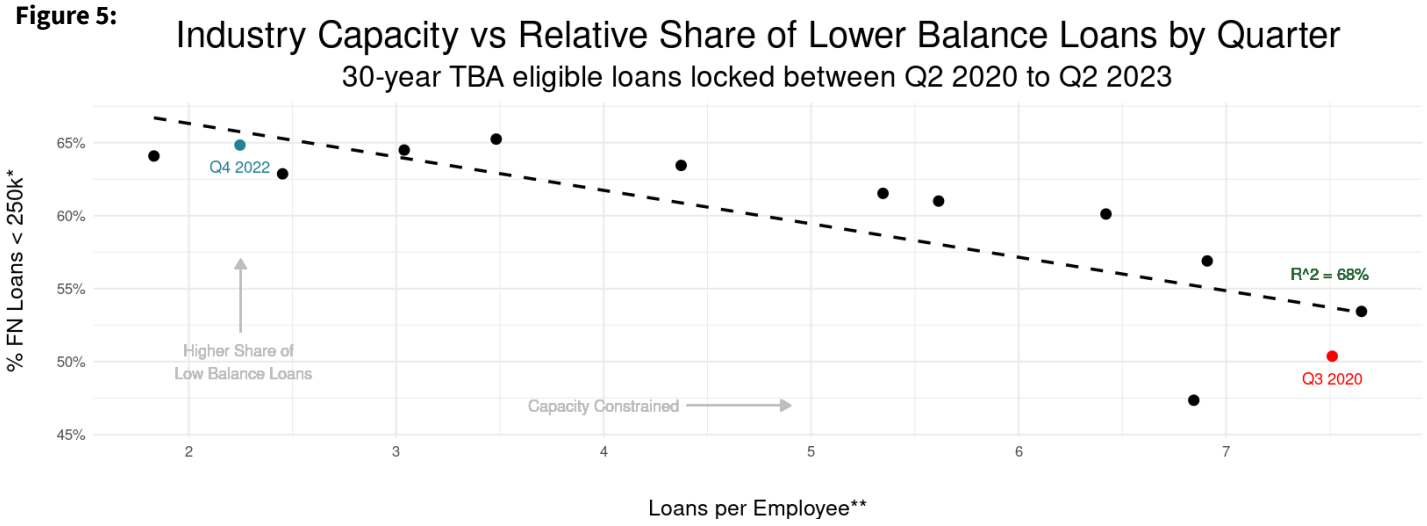
Lower loan balances comprise higher shares of originations in periods of excess capacity.

*Loans Sizes Indexed to 2020 National Case-Shiller

Source(s): Author calculations using Fannie Mae Single-Family MBS Disclosure Public Dataset, S&P CoreLogic Case-Shiller U.S. National Home Price NSA Index, and Fannie Mae's Lender Revenue Estimation Methodology (see Figure 7 in the Appendix for complete list of sources)

Figure 5 extends this analysis and places these two periods in the broader context of the pandemic era by comparing a measure of industry capacity (loans per employee) against the percentage of Fannie issuance in each quarter with a UPB less than $250k, again removing the impact of home price appreciation. The strong correlation over time reinforces the notion that lenders originate relatively larger loans as capacity becomes more constrained.

Figure 5:



*Loans Sizes Indexed to 2020 National Case-Shiller

** Loans per Employee = Total Fannie + Freddie Loans Acquisitions / Total Mortgage Industry Employment

Source(s): Author calculations using Fannie Mae Single-Family MBS Disclosure Public Dataset, S&P CoreLogic Case-Shiller U.S. National Home Price NSA Index, and Seasonally Adjusted BLS Employment Data ("Mortgage and nonmortgage loan brokers" and "Real estate credit")

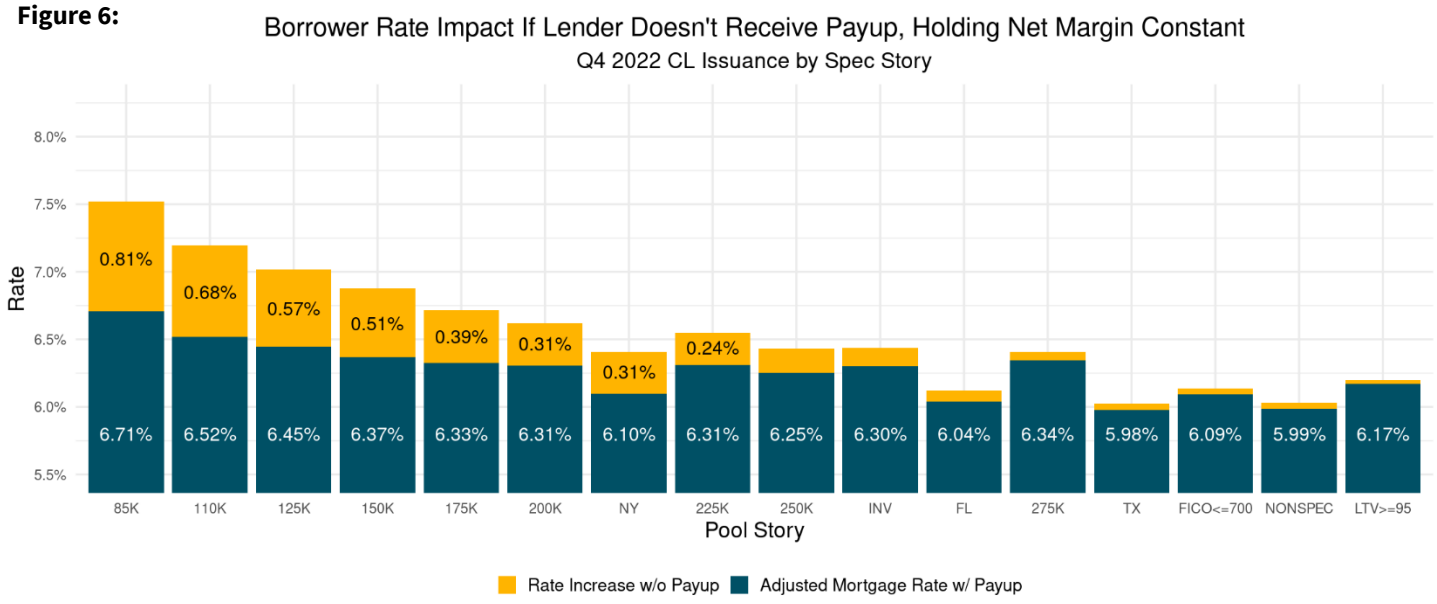
While these analyses do not demonstrate causation, in the context of the broader analysis presented in the paper, a reader could reasonably conclude that lenders tend to prioritize their capacity in favor of the most profitable segments of business.

Pay-up as a Subsidy for Low Balance Lending

A third and less well-understood concept is that the spec pay-up is critical to making lower balance lending feasible for originators. Looking at loans between $85k and $110k (left-most panel of ***Figure 3***), the pay-up is almost always *necessary* to keep **revenue** above **cost.** Without this additional revenue, the LRE demonstrates that lending to these borrowers would be unprofitable most of the time (i.e., on a loan-by-loan basis), which suggests that either the loans would not be originated, additional subsidies would be required to make originating these loans worthwhile for lenders, or lenders would simply charge these borrowers more (increasing **Additional Margin** by increasing the borrower note rate, as demonstrated next). This dynamic is often overlooked during discussions on low balance lending.

To further demonstrate the importance of the pay-up for low balance lending activity, we conduct a simple exercise in ***Figure 6*** to illustrate the potential impact of the pay-up on the borrower's mortgage rate. If we assume the pay-up were to disappear and the lender wanted to hold profitability per loan and loan volume constant, the yellow bar displays the necessary increase in borrower mortgage rates (i.e., the increase in Additional Margin required to replace the pay-up revenue). For example, looking at Q4 2022 CL issuance, the pay-up is worth up to ~81bps in rate terms for the highest pay-up story (i.e., $85k max).

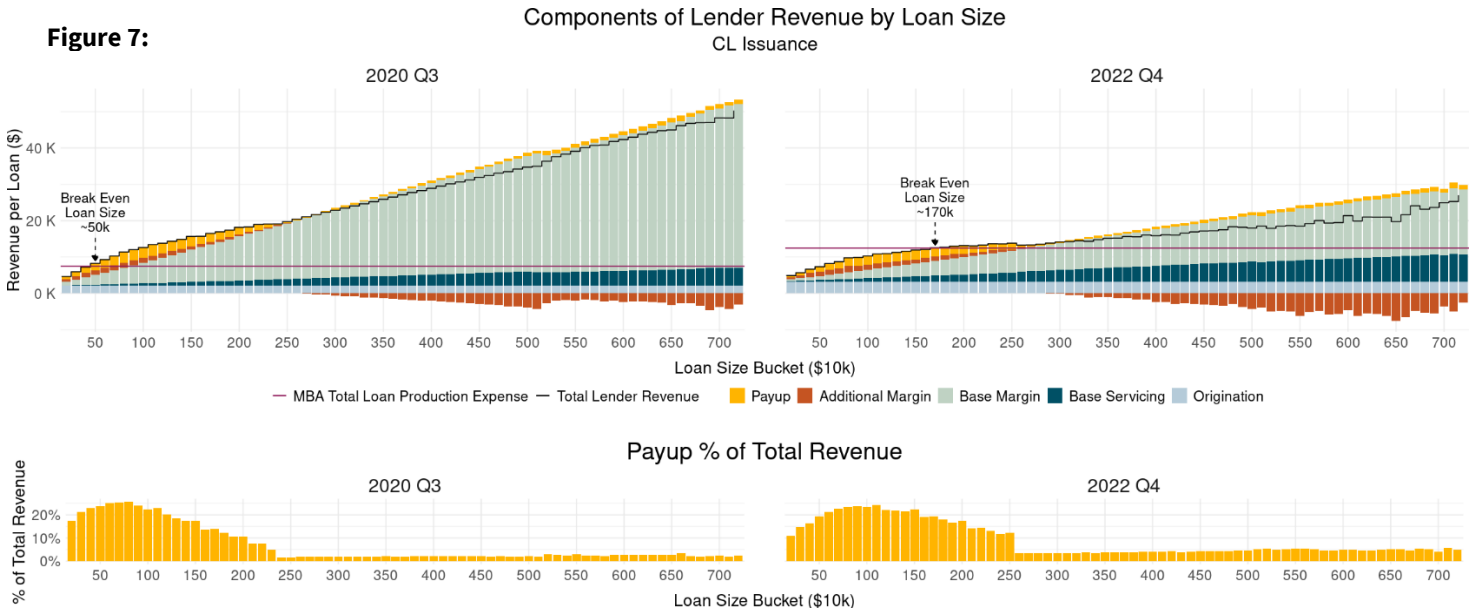
Figure 6:



Source(s): Lender Revenue Estimation Methodology (see Figure 7 in the Appendix for complete list of sources)

Figure 7 examines the loan size dynamic from a different perspective. Here we provide a point in time snapshot of lender profitability across the loan size spectrum, isolating the loan size for which revenues exceed costs. In this figure, we again contrast a period with severe capacity constraints with one where excess capacity exists. The breakeven loan size shifts upward as the lending environment becomes more challenged (see the top panel in ***Figure 7*** where **revenue** and **cost** lines intersect) and the cost to underwrite a loan increases. To emphasize the impact of the spec pay-up on profitability across these levels, the bottom panel demonstrates that the pay-up makes up a significant portion of the lender's revenue for lower balance lending (over 30% of revenue for some loan sizes). It is evident that for loan sizes featuring a high share of pay-up revenue, the impact is material in both environments.

Figure 7:



Source(s): Lender Revenue Estimation Methodology (see Figure 7 in the Appendix for complete list of sources); MBA Mortgage Bankers

Additional Applications

Investor appetite for improved performance results in a spec pay-up that can have a material impact on lender economics for lower balance loans, which tend to be made to traditionally underserved borrowers. Current industry thinking related to the impact of the spec pay-up on borrowers is primarily focused on explicitly measuring how much of the pay-up is passed through into the borrower's mortgage rate. However, as demonstrated in this paper, there is a more fundamental dynamic at play.

By making the economics of these loans more viable for lenders, the spec pay-up improves access to credit for these borrowers as more lenders compete for this business. This competitive dynamic, in turn, should have the *secondary* effect of putting downward pressure on the mortgage rates received by these borrowers, thus improving affordability and sustainability. Although the impact of the pay-up on *overall* borrowing costs is relatively small (when compared to the effect of large moves in mortgage rates, for example), this source of revenue provides a critical benefit at times for certain segments of borrowers, either simply to improve borrowing costs, or, more fundamentally, to make GSE-guaranteed loans more accessible.

While this revenue dynamic is starkest across the loan balance spectrum (due to the well understood and robust convexity benefits derived from improved prepayment performance), it applies to *any* pool that garners a pay-up, regardless of why that pay-up emerges as long as it is passed through to the lender, which is standard practice. The pay-up would not even need to be related to performance expectations if investors found other aspects of certain bonds attractive.

Conclusion

In this paper, we introduce the LRE methodology and use it to explore the relationship between individual loan economics and lender behavior. This research suggests that lenders are more incented to focus on higher balance/higher profitability loans all-else-equal, which makes it more challenging for lower balance borrowers to gain access to credit. Additionally, it illustrates that the spec pay-up is critical to improving the economics of lower balance loans for lenders, which in turn improves access to credit for underserved borrowers.

We believe this topic is a promising area for future research. Although we focus on the spec pay-up, we acknowledge that other factors impact lender behavior. For example, we would expect that application-to-close timelines, which may be variable based on loan size or borrower credit, would also impact lender's origination decisions. Therefore, we think borrowers would benefit from any research that provides a deeper understanding of how the spec pay-up, together with these other factors, influences lender behavior.

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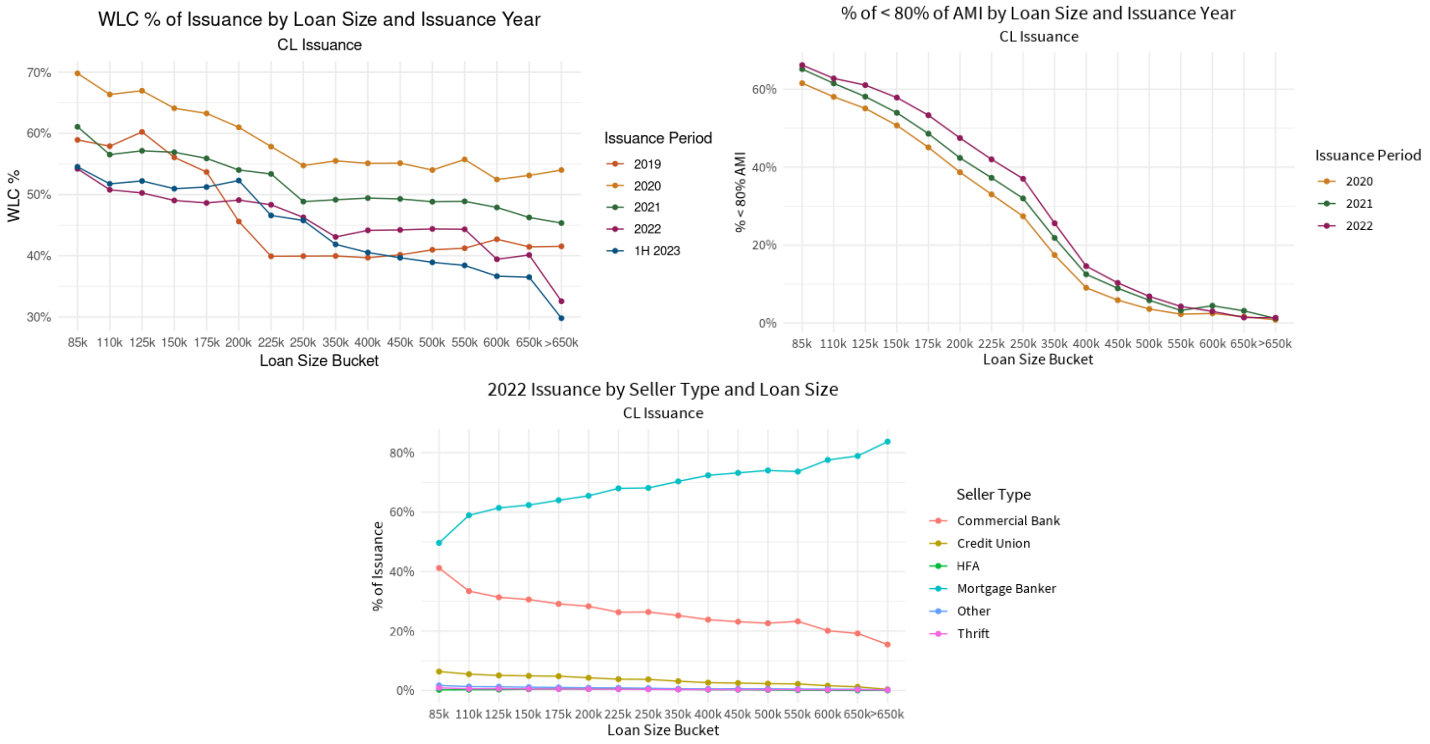
Appendix

A. An Overview of the Small Balance Lending Landscape

The four panels in ***Figure 1A*** below visualize some important trends in low balance lending. Looking at conventional MBS CL issuance, we make a few observations:

- Small balance lending tends to be issued through the Whole Loan Conduit (WLC) (top left panel).
- Lower balance loans tend to be made to lower income borrowers (top right panel).
- Commercial banks originate a relatively higher share of lower balance lending than higher balance. Mortgage banks reflect the opposite behavior (bottom).

Figure 1A: Small Balance Lending Landscape



Source(s): Fannie Mae Single-Family MBS Disclosure Public Dataset; Proprietary Fannie Mae data (AMI and seller type)

B. Lender Revenue Estimation: Data Sources, Methodology, and Limitations

The Lender Revenue Estimation ("LRE") methodology leverages various internal and external data sources to reasonably estimate the revenue that could be captured by an originator for each loan by combining known loan-level elements with reasonable assumptions of securitization economics.

This paper focuses on loans issued by Fannie into 30-year conventional MBS (i.e., CL prefix) but would also apply to other prefixes that have an actively traded TBA market, namely 15-year conventional MBS (i.e., CI prefix). We begin the analysis in July 2019 to coincide with the inception of the UMBS® market but the LRE could potentially be extended further back in time.[9]

Broadly, the methodology is applicable to the conventional mortgage universe (i.e., loans securitized by Fannie Mae and Freddie Mac), which accounts for approximately 60% of first lien mortgage origination. Roughly 20% of the market is originated by FHA/VA, which is then securitized by Ginnie Mae. Given the lack of deliverability into TBA of spec pools in the Ginnie universe, the

[9] Uniform Mortgage-Backed Security Final Rule. 84 FR 7793.

LRE may be less directly applicable to that market. Most of the remaining ~20% of origination is currently placed in bank portfolios, with a de minimis amount currently being funded by private label securitization (PLS). The LRE would not apply directly to bank portfolio loans, since these are not funded through securitization, or PLS, since the securitization structure is fundamentally different (i.e., no TBA market, no separate pay-ups). We do not expect that a large number of loans to lower-income borrowers end up in bank portfolios or PLS. However, these channels can be an important source of funding for some underserved borrowers, such as self-employed individuals.[10]

DATA

The gross note rate and original UPB are available publicly in loan-level MBS disclosures published by Fannie Mae on its disclosure application, PoolTalk®.

Proprietary data elements include contractual guarantee fees, loan-level price adjustments (LLPAs), (permanent) points, IO (Interest-Only) and servicing valuations, and spec pay-ups. Contractual g-fees and LLPAs are those actually charged by Fannie Mae at a loan-level. Points paid by the borrower are from the Uniform Loan Delivery Dataset (ULDD). ULDD is a unique dataset that is part of the Uniform Mortgage Data Program (UMDP) and provides a common set of loan delivery variables required by the GSEs from sellers for single-family loans. Fannie Mae relies on its internal opinion of market value for the excess IO being bought and sold by Fannie through the MBS pooling process. The valuation multiples used to convert yield (i.e., margin) into price are Fannie Mae's internal IO valuations and are applied at the loan level based on a loan's gross note rate and lock date. Fannie's internal view of servicing valuations leverages Servicing Release Premiums (SRP) at time of commitment from its Servicing Marketplace (SMP). Because not all loans have servicing sold through SMP, we calculate the average servicing multiples by gross note rate, UPB buckets, and pricing date for the loans that were sold and apply the values to the entire loan-level dataset. The pay-ups used are Fannie's view of market pay-ups, which is based primarily on the actual pay-ups received in monthly WLC auctions.

External market data includes MBS Current Coupon Yield (CCY) and the MBA cost and revenue data. The CCY is the yield on the par ($100) priced FNCL TBA and obtained from Citi Velocity. We use two data points from the MBA Mortgage Bankers Performance Report, which are based on the survey results of independent mortgage banks (as well as a small number of bank subsidiaries) and reported in aggregate on a quarterly basis. The data includes retail originators, but not broker or correspondent lenders. For cost data, we use the total loan production expense, which reflects the simple average dollar cost across all respondents, meaning that all lenders in the sample are given the same weight. For origination-related revenue, we use the dollar amount of total origination-related revenue from the report, which includes loan origination fees, fee revenue earned on loans acquired from correspondents and brokers, and other fees like for underwriting, processing, and administration.

Figure 2A:

Summary of Data Elements Used

Data Sources	Type	Data Elements	Notes
Uniform Loan Delivery Dataset (ULDD)	Internal	Loan-level points paid by borrower	More information on ULDD can be found on Fannie's website here.
Uniform Closing Dataset (UCD)	Internal	Loan-level lock date	
SMP (Servicing Marketplace)	Internal	Loan-level servicing valuations	More information on SMP can be found on Fannie's website here.
Fannie WLC	Internal	Spec pay-up from pool auctions, IO Valuations from internal models	
Fannie Pricing Data	Internal	Loan-level contractual gfee and charged LLPAs	
MBS Disclosures	External	Loan-level gross note rate and original UPB	Available in the public MBS disclosures provided in PoolTalk.
Citi Velocity	External	Current Coupon Yield (CCY)	This data is also available from a number of other sources.
MBA Mortgage Bankers Performance Report	External	Quarterly industry origination-related Revenue and total loan production expense	More information on this data can be found here.

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REVENUE COMPONENT CALCULATIONS

Origination Related

We utilize the Annual Mortgage Bankers Performance Report data for origination revenue (which is provided directly in dollars). We assume this revenue to lenders (i.e., cost to the borrower) is constant across all loans for each quarter given the reporting frequency.

Base Servicing

We calculate the servicing revenue by converting a 25bps base servicing strip, which is the minimum required for all fixed-rate loans, into upfront dollar terms using servicing multiples from SMP. The servicing multiple represents the amount paid for the right to receive a strip of servicing revenue on a given loan. These multiples fluctuate over time based on the level of interest rates, the size of the servicing strip sold, and various loan characteristics, including gross note rate and loan size. Fannie Mae sells servicing on the loans it acquires through SMP. Given the volume of servicing sold through SMP, we find that this data is generally a fair representation of the active bid for servicing in the mortgage market at a given time. Using this data, we apply a servicing multiple to each loan in our dataset by lock month, gross note rate, and loan size. The loan-level servicing revenue in dollars is then calculated as:

$$\boldsymbol{Servicing\ Revenue} = Original\ UPB * 25\ bps * Servicing\ Multiple$$

Margin

To better measure the all-in cost to the borrower, we adjust the borrower's gross notes rate for points/fees, which we obtain from ULDD. To control for rate differences due to credit characteristics, we back LLPAs out of the gross note rate. We use Fannie's internal IO multiples to convert the upfront points and LLPAs into rate/yield.

$$\boldsymbol{All\ in\ Mtg\ Rt} = Gross\ Note\ Rt + \frac{Points - LLPAs}{IO\ Mult}$$

We also calculate a breakeven note rate for the lender. This is the mortgage rate on a loan at which the lender could sell the loan into the secondary market and receive no gain-on-sale (apart from the servicing). This is calculated as:

$$\boldsymbol{Breakeven\ Note\ Rt} = CCY + Gfee + Base\ Servicing$$

Generally, the lender's margin is the value captured by the lender when they sell the loan to Fannie Mae or sell an MBS to the market. We define total margin as the difference between the borrower's ***All in Mortgage Rate*** and the ***Breakeven Note Rate***. We use internal IO valuations to convert the revenue into upfront dollar terms. The methodology decomposes total margin into two components:

- **Base Margin** indicates the theoretical margin revenue a lender would receive if they made a loan at the par mortgage rate on this loan's lock date. We use the average daily all-in mortgage rate for the CL population as the par rate, instead of more popular industry rate indices, as it allows for the most direct comparison of rates inclusive of points and credit (i.e., LLPAs).

$$\boldsymbol{Base\ Margin\ Revenue} = (Par\ Mtg\ Rt - Breakeven\ Note\ Rt) * Orig\ UPB * IO\ Mult$$

- **Additional Margin** describes the incremental revenue the lender makes above the base margin by offering a mortgage rate above the par rate applicable on the loan's lock date.

$$\boldsymbol{Additional\ Margin\ Revenue} = (All\ in\ Mtg\ Rt - \ Par\ Mtg\ Rt) * Original\ UPB * IO\ Mult$$

Pay-up

For each loan, we calculate the $ value of the highest paying spec story for which the loan qualified at the time.

$$\boldsymbol{Payup\ Revenue} = Payup * Orginal\ UPB$$

FIGURE 2 STYLIZED REVENUE CALCULATION NOTES

Figure 2 considers an example for a $400k loan that received the par mortgage rate and compares it to a $110k loan that received a mortgage rate 25bps higher than par. We use assumptions that are consistent with loans made in 2021 to demonstrate the impact in a refinancing wave, where pay-ups are particularly high.

A few considerations:

- Many parts of the calculation are identical between the two loans, including the breakeven note rate (i.e., gfee, base servicing, and CCY), the par mortgage rate, and the servicing and IO multiples. While the multiples are assumed to be identical for this example, in practice the multiples may not be the same for both loans due to different loan sizes and mortgage rates.
- Dollar Origination Revenue is identical for both loans based on our simplifying assumption from the MBA data.
- While the base servicing and base margins are the same in percentage terms for both loans, the dollar revenue is materially larger for the $400k loan due to its larger loan size.
- Based on the different mortgage rates received for the two loans, only the $110k loan receives additional margin.
- We assume that the $400k loan is delivered into a generic pool and does not receive a pay-up. The $110k loan received the market-based pay-up for $110k max MBS pools.
- Although this example assumes the $400k loan does not receive a pay-up, there are instances where the market might pay-up for higher balance loans. For example, the market recognizes convexity benefits for high FICO/Low LTV loans or loans located in a particular state, such as New York. However, the pay-ups on these spec stories tend to be lower than low loan balance pay-ups due to relatively less stable prepay profiles.
- While the lender receives additional margin and a pay-up revenue on the smaller loan; the $400k loan is still materially more profitable in dollar terms due to the servicing and base margin revenue.

LIMITATIONS

a) **Estimation versus Actual Profitability** – We acknowledge that the Lender Revenue Estimation methodology does not incorporate actual loan-level costs but is instead meant to be instructive at various levels of aggregation.

b) **Cost Data Granularity (MBA Mortgage Bankers Performance Report)**
   - The intended contribution of this paper is to provide a more robust estimation of lender revenue that arise from secondary market execution, including impact of specific note rate and points paid by borrowers on an individual loan and general estimate of lender revenue at origination. However, we acknowledge some limitations to the MBA cost data when comparing it against our revenue estimations. We log these drawbacks here and discuss their impacts:
     1. The MBA cost data reports the simple average cost for mortgage bankers included in the data (i.e., every lender, regardless of origination volume, is equally weighted in the reported metrics). Consequently, we would assume some difference in lender mix between the MBA survey and Fannie Mae acquisitions.
     2. The data does not break out cost by loan purpose. Instead, it represents the cost for a given quarter based on the average origination mix of the reporting mortgage banks. While our methodology enables the estimation to be split by loan purpose, we acknowledge that the cost data is less directly comparable at this level of granularity given recognized differences in costs between purchase and refi origination. However, such differences in costs are independent of the secondary market execution, and therefore pay-ups, the variable of interest in this paper.

3. The MBA Mortgage Bankers Report does not break out costs by loan size in a manner that can be leveraged for our analysis. Fratantoni et al (2023) find that costs are correlated with loan size to some extent, albeit substantially less so than revenue. Given this relatively low correlation between loan size and cost, we feel it is reasonable to treat costs as fixed in this analysis.
4. The data does not include cost estimates for lenders not represented by the MBA or MBA members that choose to not make their data available in the report. The practical implication of this is that we do not have granular cost data for banking institutions or correspondents/brokers, which constitute a material portion of Fannie Mae acquisitions.

- While we recognize the limitations of the MBA costs data when used in the context of this paper, we believe it provides a reasonable assumption of cost in aggregate and is instructive for our purposes. We note that Fannie does receive more granular, lender-level cost data as part of its partnership with the MBA. This data sometimes indicates substantial differences in reported lender costs. However, given that we do not have detailed insight into the methodology used by each lender, as well as the absence of comprehensive cost data for traditional banking institutions, we find it more suitable to use only the aggregate cost metric time series and not attempt to apply lender level cost data in our analysis. We believe addressing some of these limitations would be beneficial for the industry but leave this to future research.

c) Origination Revenue Granularity (MBA Mortgage Bankers Performance Report) – Similar to the MBA cost data, we believe more granularity for this datapoint would improve the methodology. However, given limitations on what data is available to Fannie Mae, we also leave this task for future research. We feel it is a reasonable assumption for our purposes to view this as fixed across loans but do expect some variability in actual origination revenue across lenders, loan size, or other loan characteristics.

d) Other Sources of Revenue and Cost Data

- In addition to the MBA Mortgage Bankers Performance Report, the MBA partners with the STRATMOR Group to conduct the Peer Group Survey and Roundtable Program (PGR). The resulting dataset also provides information on production revenues, expenses, and overall profitability. While these data appear to provide a more granular breakout of revenues and cost than the MBA Mortgage Bankers Performance Report, there are less originators included (Fratantoni et al 2023). More importantly, we do not have access to the dataset.
- Varying degrees of mortgage lending revenue and cost data is available from publicly traded companies in their quarterly financial disclosures. However, these data are neither comprehensive nor consistent between companies and thus not suitable for this analysis.

e) Actual Spec Pay-ups Paid May Vary – We use the pay-up Fannie receives when selling pools out of its WLC as a proxy for market pay-up levels (i.e., the sell-side pay-up). The WLC is generally the largest single seller of pools and thus provides timely insight into market pay-up levels. While the sell-side pay-ups are appropriate for MBS loans, we note that actual pay-ups received from investor by MBS lenders vary based on the market's perception of relative prepayment performance. In future iterations, we could explore addressing this variation by considering actual pay-ups received by lenders in the MBS market.

f) Aggregator Profits Not Decomposed – The methodology estimates the total theoretical revenue made on a given loan. For instances where a loan is sold to an aggregator, who then sells it to Fannie Mae, the LRE estimates the total revenue (originator AND aggregator revenue). It does not break out the aggregator revenue separately.

g) IO Multiples – The methodology leverages Fannie Mae's internal valuation of IO, which is used in our WLC's pooling process, to value the lender base and additional margin in upfront terms. We do not have direct insight into lenders' internal view of IO value. In practice, lenders might receive and/or value IO differently than Fannie Mae. Using different values for the IO could alter the estimation of dollar margin revenue in absolute terms. However, we have experimented with using other measures of IO and concluded that this would not materially alter the conclusions made in this paper.

h) Lender Hedging – The methodology assumes that lenders perfectly hedge their pipeline (i.e., price change with no cost). In practice, it is not possible to perfectly hedge.

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