



The asymmetric effects of softwood lumber duties, tariffs, and mortgage rates on housing payments

Jinggang Guo^{a,*}, Jeffrey P. Prestemon^b, J. Matthew Fannin^a

^a Department of Agricultural Economics & Agribusiness, Louisiana State University, Baton Rouge, LA, 70803, USA

^b U.S. Department of Agriculture, Forest Service, Southern Research Station, RTP, 27709, NC, USA

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ABSTRACT

This paper quantifies how softwood lumber tariffs propagate through the U.S. economy to affect homebuyers' monthly mortgage payments, comparing this channel to direct mortgage rate changes. Using an integrated Armington-Leontief framework with 2022 IMPLAN data, we trace a tariff shock on Canadian softwood lumber into residential construction costs and mortgage payments. For a baseline \$420,000 home with a typical principal-and-interest payment of about \$2,190, a 25 % tariff raises monthly payments by \$26-\$41 (1.2 %–1.9 %), depending on market flexibility. In contrast, a one percentage point mortgage rate increase raises payments by \$229, nearly six times larger. The tariff impact weakens by 36 % as markets adjust from rigid to flexible conditions, whereas mortgage rate effects persist throughout the loan term. A relatively small 19 basis point rate reduction completely offsets a 25 % tariff impact. Our results show that for housing affordability, monetary policy dominates trade policy, with critical implications for the ongoing U.S.-Canada softwood lumber trade dispute.

1. Introduction

The U.S.–Canada softwood lumber trade dispute continues to generate significant policy volatility, with substantial implications for U.S. housing affordability. In 2025, the U.S. Department of Commerce finalized combined antidumping (AD) and countervailing duty (CVD) rates approaching 35 % for many Canadian producers (U.S. International Trade Administration, 2025). These trade remedy duties—imposed to address alleged unfair trade practices—are applied in addition to the zero regular tariff rate that Canadian lumber receives under the United States-Mexico-Canada Agreement (USMCA). Canadian imports constitute the majority of U.S. softwood lumber imports and supply roughly a quarter to a third of total U.S. consumption, meaning these duties create direct cost shocks that propagate through the construction supply chain, ultimately affecting the housing payments faced by homebuyers. At the same time, monetary policy has reshaped housing affordability through a more direct channel. Between early 2022 and late 2023, the Federal Reserve's efforts to control inflation drove the average 30-year fixed mortgage rate from around 3 % to over 7 % (Federal Reserve Bank of St. Louis, 2025; Freddie Mac, 2025). This rapid increase in financing costs directly impacts the monthly mortgage payment, which is the primary financial constraint for most American homebuyers.

Our paper aims to address one key question: How do tariffs on a critical construction input propagate through the U.S. economy to affect monthly mortgage payments, and how does this impact compare quantitatively to the effect of changes in mortgage rates? To answer this, we develop an integrated framework that combines an Armington (1969) trade model with a Leontief price input-output

* Corresponding author.

E-mail address: jguo@agcenter.lsu.edu (J. Guo).

Table 1
Scenario Impacts — Input-Output vs Simple Pass-Through Models.

Horizon	Tariff	Direct Softwood Lumber Price Shock (%)	Δ Monthly Payment (\$) [I-O]	Δ Monthly Payment (\$) [Simple]
Short-Run	15 % Tariff	9.01	25.69	8.34
	25 % Tariff	14.54	41.46	13.46
	35 % Tariff	19.79	56.42	18.31
Medium-Run	15 % Tariff	7.46	21.28	6.91
	25 % Tariff	11.81	33.68	10.93
	35 % Tariff	15.76	44.93	14.58
Long-Run	15 % Tariff	6.01	17.14	5.56
	25 % Tariff	9.31	26.55	8.62
	35 % Tariff	12.15	34.64	11.24

Note: The Input-Output (I-O) model captures economy-wide cascading effects through inter-industry linkages, while the Simple model applies the softwood lumber price shocks only to baseline materials costs. The I-O framework reveals monthly payment impacts approximately 3 times larger than simple pass-through calculations, with the gap ranging from \$12–38 per month. This 68 % underestimation by the simple approach demonstrates that partial equilibrium analyses miss critical spillovers through intermediate sectors such as millwork manufacturing, transportation services, and wholesale trade margins.

model (Miller and Blair, 2009). This approach allows us to trace a tariff-induced shock to softwood lumber prices through inter-industry linkages to find the final impact on construction costs, which we then translate into the change in a monthly mortgage payment for a representative home.

2. Model

We quantify the impact of a tariff on Canadian softwood lumber¹ on a U.S. homebuyer's monthly mortgage payment using a Leontief price input-output (I-O) system. First, softwood lumber is a nested Constant Elasticity of Substitution (CES) composite. At the lower nest, Canadian (p_{CA}) and other foreign (p_O) sources form an import composite price, p_M :

$$p_M = [\alpha_{CA} p_{CA}^{1-\sigma_m} + (1 - \alpha_{CA}) p_O^{1-\sigma_m}]^{\frac{1}{1-\sigma_m}} \quad (1)$$

where α_{CA} is the share parameter representing Canadian softwood lumber's baseline value share within imports, and σ_m is the elasticity of substitution between Canadian and other foreign sources. At the upper nest, this import bundle combines with domestic softwood lumber (p_{US}) to yield the final composite price paid by builders, p_L :

$$p_L = [\alpha_{US} p_{US}^{1-\sigma_d} + (1 - \alpha_{US}) p_M^{1-\sigma_d}]^{\frac{1}{1-\sigma_d}} \quad (2)$$

where α_{US} is the domestic share parameter and σ_d is the elasticity of substitution between domestic and imported softwood lumber. An ad valorem tariff τ raises p_{CA} with near-complete pass-through, inducing behavioral responses: strategic spillover pricing from other importers and umbrella pricing from domestic producers, the latter being attenuated by capacity expansion. This block yields the direct softwood lumber price shock, $\Delta p_L \equiv p_L - 1$.

Second, this commodity shock propagates economy-wide via a Leontief price I-O block. Using the technical coefficients matrix $\mathbf{A}$ from 2022 IMPLAN data (IMPLAN, 2022), the vector of sectoral price changes, $\Delta \mathbf{p}$, is determined by:

$$\Delta \mathbf{p} = (\mathbf{I} - \mathbf{A}^\top)^{-1} \mathbf{e} \quad (3)$$

To bridge the Armington commodity shock with the I-O sectoral price (which includes value-added), we construct the shock vector $\mathbf{e}$ by applying a scaled shock only to softwood lumber-related sectors ($j \in \mathcal{L}$):

$$e_j = \begin{cases} \xi \cdot \Delta p_L & \text{if } j \in \mathcal{L} \\ 0 & \text{otherwise} \end{cases} \quad (4)$$

where the calibration factor ξ ensures the propagated sectoral price aligns with the Armington composite. The final construction price change, Δp^{cons} , is an output-weighted average over construction sectors.

Third, the construction price increase translates into a new home price via its cost share (λ). This higher home price ($P_1 = P_0 + \Delta P$) is mapped to a change in the monthly payment for a 30-year fixed-rate mortgage using the standard amortization formula, $M(P, r)$. To compare policy levers, we decompose the total payment change from a joint tariff-and-rate shock using a Shapley (1953) allocation. We also solve the rate-equivalent offset, Δr^* , which is the interest rate change that produces the same payment impact as the tariff:

¹ Under USMCA, regular tariffs on Canadian softwood lumber are 0% (duty-free). However, Anti-Dumping (AD) and Countervailing Duty (CVD) trade remedies—legally distinct measures permitted under USMCA Article 10.5—are imposed separately. As of the Sixth Administrative Review (August 2025), the combined AD/CVD rate is approximately 35.19% (14.63% CVD + 20.56% AD) for most Canadian producers. These duties function economically as ad valorem tariffs.

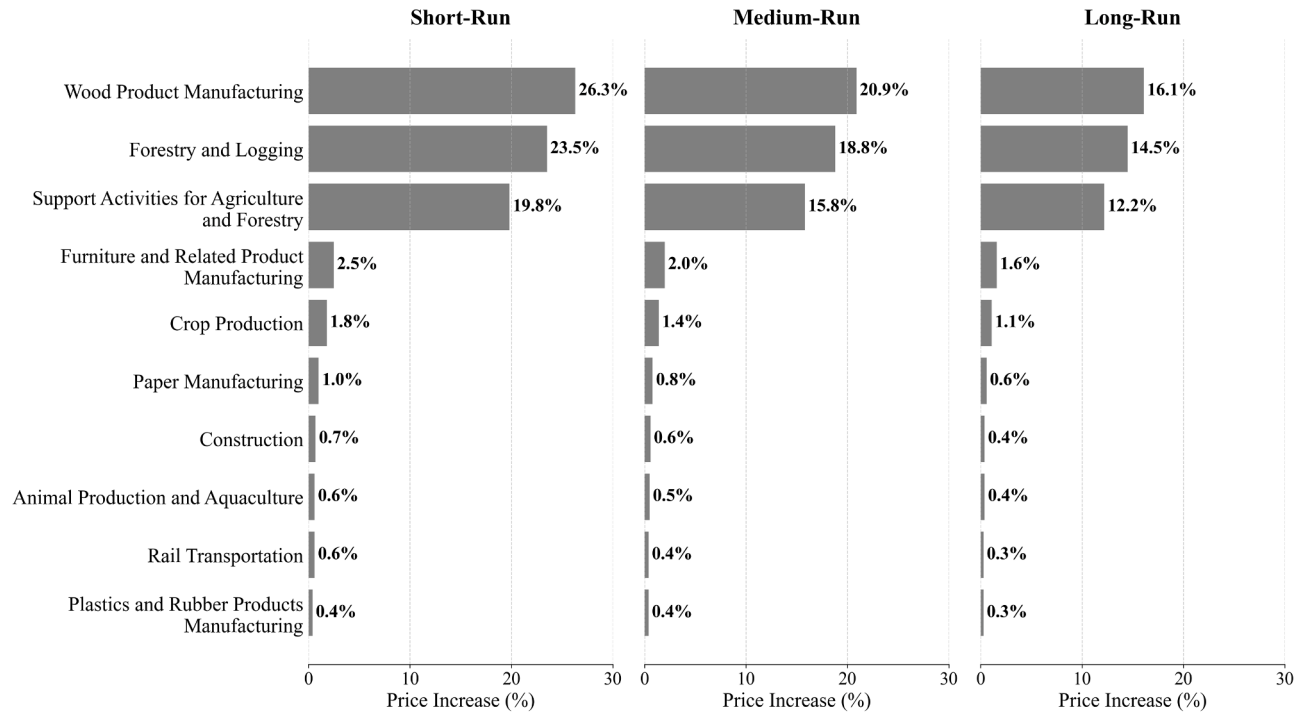


Fig. 1. Sectoral Pass-through under 35 % Tariff Across Different Market Conditions.

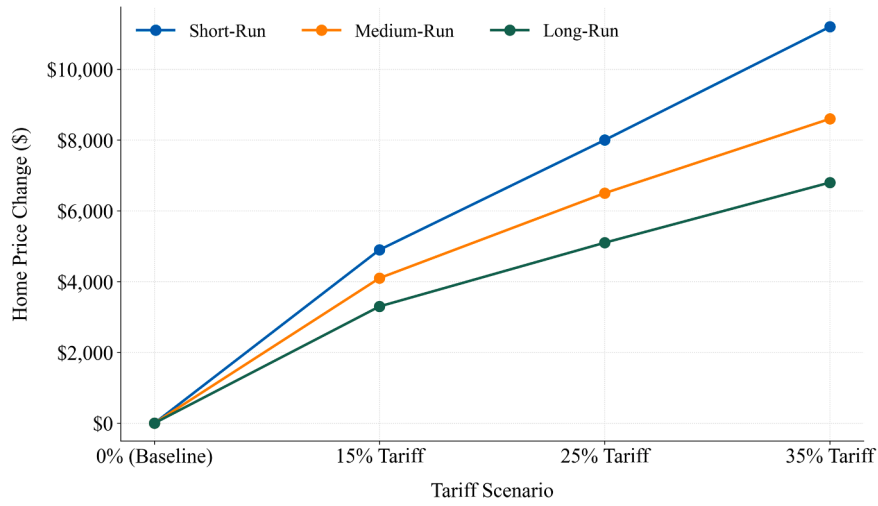


Fig. 2. Tariff Pass-through to Home Prices Across Different Market Conditions.

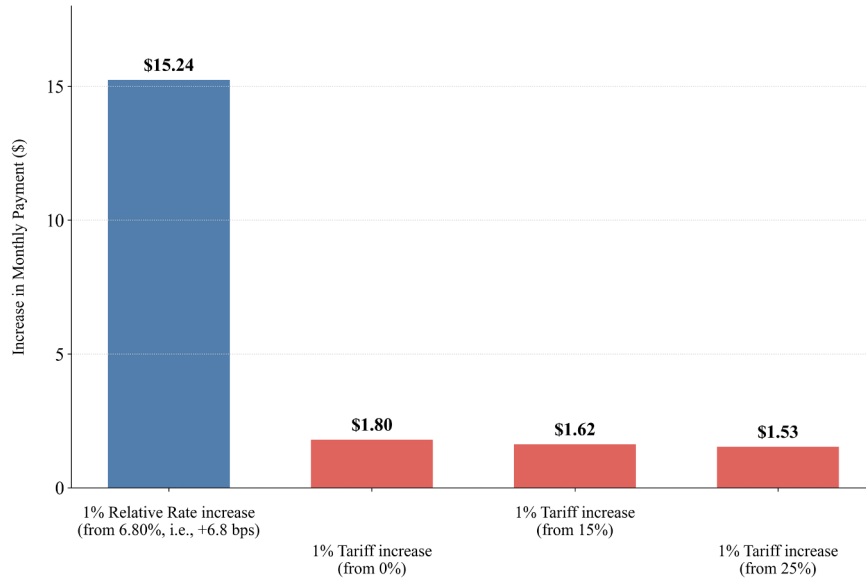


Fig. 3. Tariff vs. Mortgage Rate Payment Sensitivity.

$$M(P_0, r_0 + \Delta r^*) - M(P_0, r_0) = M(P_1, r_0) - M(P_0, r_0) \quad (5)$$

This provides a direct, policy-relevant metric for comparing the two channels. Our model is evaluated across short-, medium-, and long-run scenarios that represent different states of market responsiveness rather than a strict timeline. These scenarios capture the fundamental insight that market rigidities attenuate the initial tariff shock over time. In the short-run, buyers cannot easily substitute away from Canadian lumber, and domestic producers have limited ability to expand capacity. In the long-run, substitution opportunities increase, domestic capacity expands, and competitive pressures reduce umbrella pricing effects. Please see Appendix A for detailed modeling parameters, scenario definitions, and computational procedures.²

² Demo code illustrating the computational framework is available at: https://github.com/jinggangguo/Housing_FRL

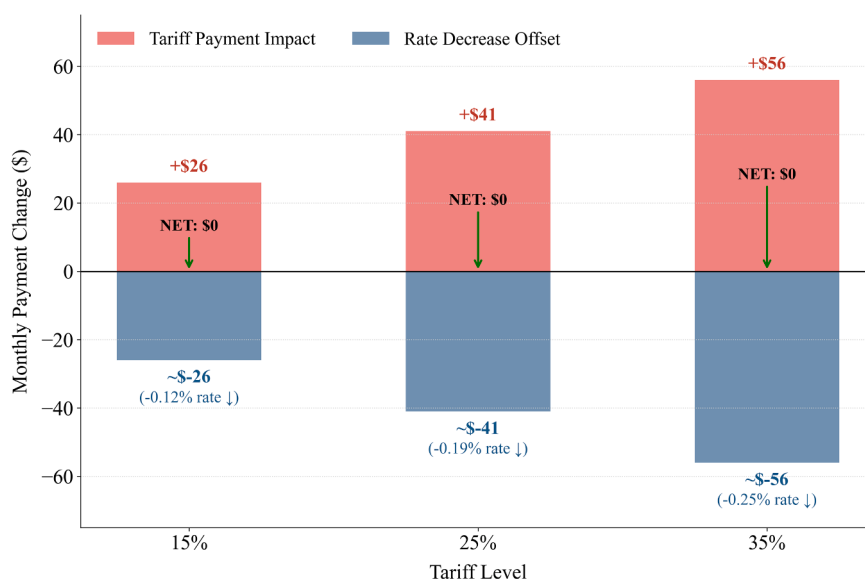


Fig. 4. Tariff– Mortgage Rate Trade-off in Monthly Payments.

3. Results

3.1. Direct softwood lumber price effects

The imposition of tariffs on Canadian softwood lumber generates an immediate price shock, the magnitude of which depends critically on the market's capacity for adjustment (Table 1). In a “short-run” scenario characterized by market rigidities—low substitution elasticities and fixed domestic capacity—a 25 % tariff results in a 14.5 % increase in the composite softwood lumber price. This reflects high pass-through from Canadian exporters and strong umbrella pricing from domestic producers. In contrast, a “long-run” scenario representing a state of greater market flexibility—with higher substitution elasticities and expanded domestic capacity—sees the price impact of the same 25 % tariff fall to 9.3 %. The price impact weakens because domestic producers lose their ability to set high prices as supply expands and buyers find alternative sources.

3.2. Economy-Wide price spillover effects

The initial softwood lumber price shock propagates through the 546 sectors of the economy via input-output linkages (Fig 1). The most significant price increases are concentrated in industries with direct softwood lumber inputs. Under a 35 % tariff in the rigid “short-run” scenario, Wood Product Manufacturing experiences a 26.3 % price increase, followed by Forestry and Logging at 23.5 %. The Leontief price model reveals that these cost increases cascade through the supply chain, affecting downstream sectors like Furniture and Related Product Manufacturing (2.5 % price increase) and the Construction sector itself (0.7 % price increase). These inter-industry effects are substantial, amplifying the total impact on construction costs by 30 to 40 % beyond what a simple pass-through analysis of direct softwood lumber costs would suggest.

3.3. Translation to home prices and monthly payments

The culmination of these upstream price increases translates into higher costs for residential construction and, ultimately, higher home prices (Fig 2). For a baseline \$420,000 home, a 25 % tariff in the rigid “short-run” scenario leads to a home price increase of approximately \$8,000. This, in turn, increases the monthly mortgage payment by approximately \$41, assuming a 6.8 % mortgage rate and a 20 % down payment. As the market becomes more flexible, this impact moderates; in the “long-run” scenario, the same tariff increases the monthly payment by only \$26. This demonstrates that the tariff's effect on the final payment burden is significantly dampened by the economy's structural capacity to adjust.

3.4. Marginal sensitivity

A direct comparison of policy levers reveals an asymmetry in their power to influence monthly payments (Fig 3). A one percentage point increase in the mortgage rate from its 6.8 % baseline raises the monthly payment by \$229. This is approximately 5.6 times larger than the \$41 impact of a 25 % tariff under the most rigid market conditions. On a marginal basis, the disparity is even greater: a one

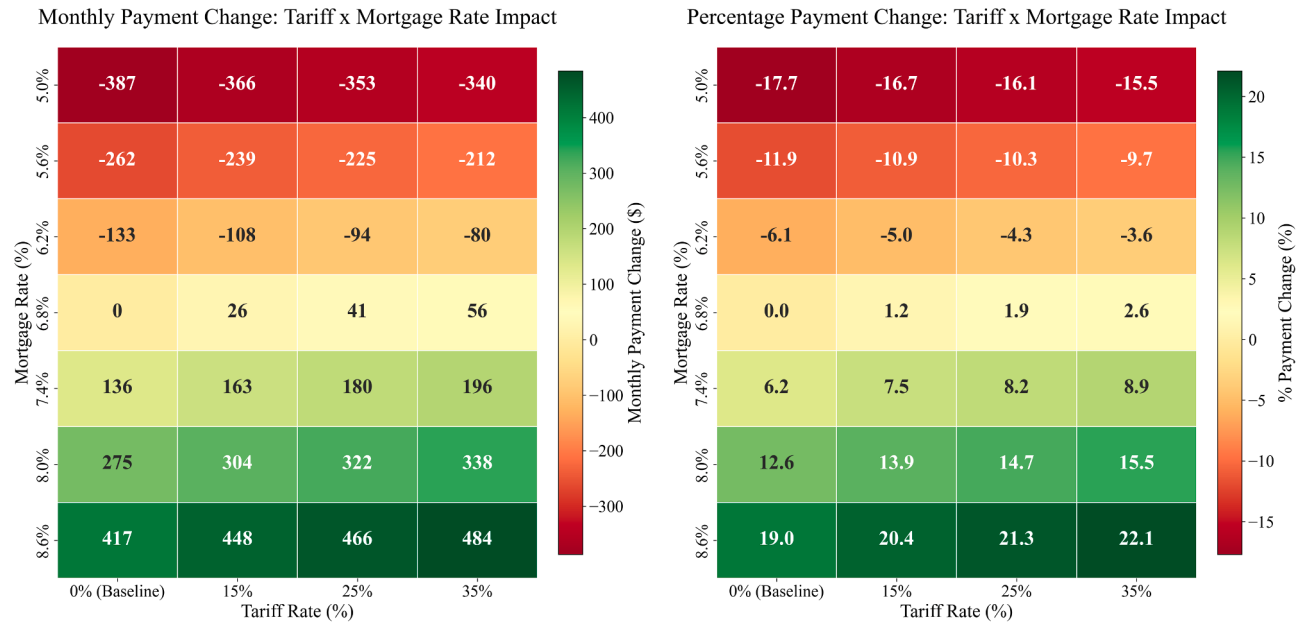


Fig. 5. Tariff–Mortgage Rate Interaction in Housing Payment Dynamics.

percentage point increase in the tariff (e.g., from 15 % to 16 %) raises the monthly payment by only \$1.62, whereas a 1 % relative increase in the mortgage rate (a 6.8 basis point move) increases it by \$15.24.

This relationship is further clarified through a breakeven analysis, which calculates the mortgage rate reduction required to neutralize a tariff's impact (Fig 4). To completely offset the \$41 monthly payment increase from a 25 % tariff in the “short-run” scenario, mortgage rates would need to decrease by only 19 basis points. Even the \$56 increase from a 35 % tariff is neutralized by a 25 basis point rate reduction. These findings establish that changes in financing conditions measured in basis points have equivalent or greater effects than trade policy changes measured in full percentage points.

3.5. Market responsiveness

The scenarios reveal a fundamental difference in the nature of the two policy channels (Fig 5). The impact of tariffs on monthly payments attenuates substantially—declining by 36 % between the rigid and flexible market scenarios—as capacity expansion and input substitution mitigate the initial shock. In contrast, the impact of a given mortgage rate is constant for the duration of a fixed-rate loan, absent refinancing. This persistence magnifies the relative importance of financing conditions in determining the total cost of homeownership. While tariffs create real cost pressures, their ultimate impact on the monthly financial obligation of homebuyers is dominated by the prevailing interest rate environment.

4. Conclusion

Our study shows a pronounced asymmetry between the effects of softwood lumber tariffs and mortgage rates on the monthly payment obligations of American homebuyers. While tariffs on this critical construction input create measurable cost increases that propagate through the U.S. economy, their ultimate impact on monthly payments is an order of magnitude smaller than that of typical fluctuations in financing conditions. Our integrated model shows that even a significant 25 % tariff translates to a modest payment increase of approximately \$26 to \$41, depending on the market's structural capacity to adjust. This effect can be completely offset by a mortgage rate reduction of just 12 to 19 basis points. In contrast, a one percentage point increase in mortgage rates imposes a payment burden over five times larger. This core finding establishes that for the specific metric of the monthly mortgage payment, monetary policy and broader capital market conditions are the dominant drivers.

Although the results are robust under our modeling assumptions, several limitations suggest clear directions for future work. Notably, our analysis does not endogenize labor costs; it assumes that wage rates remain fixed as the tariff shock propagates through material input channels. A more comprehensive general equilibrium model could capture potential feedback loops where tariff-induced changes in the construction and forestry sectors affect employment and wages, thereby creating a secondary channel of impact on housing costs. Furthermore, this study employs a national input-output structure, which necessarily averages over significant regional variations in softwood lumber sourcing, construction practices, and housing market conditions. Despite these limitations, this study provides a clear and quantitative baseline for understanding the relative impacts of trade and monetary policy on a key component of household expenditure, offering a crucial perspective for policymakers navigating the complex interplay between trade policy and housing market dynamics.

Disclaimer

The findings and conclusions in this publication are those of the authors and should not be construed to represent any official USDA or U.S. Government determination or policy.

CRediT authorship contribution statement

Jinggang Guo: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Methodology, Formal analysis, Data curation, Conceptualization. **Jeffrey P. Prestemon:** Writing – review & editing, Validation, Funding acquisition, Conceptualization. **J. Matthew Fannin:** Writing – review & editing, Validation, Investigation.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.frl.2025.108844](https://doi.org/10.1016/j.frl.2025.108844).

Data availability

The authors do not have permission to share data.

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