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Music sentiment and stock returns: A structural break in sentiment dynamics

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ABSTRACT

Edmans et al. (2022) show that more positive music sentiment predicts higher same-week returns followed by a reversal next week, with absolute sentiment linked to volatility and a flight-to-safety pattern in government bonds. We replicate these results for the original study period of 2017–2020. However, for 2021–2024, the one-week return reversal, the signature pattern of sentiment-induced temporary mispricing, disappears entirely. Supporting this, the sentiment-volatility link vanishes and the flight-to-safety relation inverts, together indicating a structural break in the sentiment-market relationship. The evidence is consistent with a more macro-dominated post-2020 environment in which sentiment and asset prices co-move in response to common news rather than through persistent behavioral channels, although alternative explanations cannot be ruled out. Our findings raise caution about applying pre-2020 sentiment patterns in trading or modelling.

1. Introduction

A growing literature documents that investor sentiment affects asset prices, challenging the efficient market hypothesis. Studies link stock returns to mood-affecting factors such as weather (Hirshleifer and Shumway, 2003), sports results (Edmans et al., 2007), and seasonal patterns (Kamstra et al., 2003). However, these approaches rely on exogenous shocks assumed to influence mood uniformly.

Edmans et al. (2022) introduce a novel endogenous alternative based on music sentiment derived from Spotify streaming data.[1] Unlike event-based proxies, this measure captures actual collective mood continuously across 40 countries. Their findings reveal a striking pattern. Higher music sentiment predicts higher same-week stock returns, followed by reversal the next week, consistent with sentiment-induced temporary mispricing. Additionally, absolute sentiment predicts volatility, and negative sentiment triggers a flight-to-safety into government bonds.

These results, however, are estimated on data from 2017 to 2020, a period of relative macroeconomic stability followed by the sudden COVID-19 shock. Whether such patterns persist in different economic environments remains untested. This is consequential, as sentiment predictability appears regime-dependent, with effects strongest in expansions but generally weak in recessions (Chung et al., 2012). More broadly, documented return predictability often attenuates out of sample (McLean and Pontiff, 2016), strengthening the case for direct replications under varying conditions. The post-2020 period, characterized by historically high inflation, aggressive

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[1] An earlier version of their music-based equity sentiment measure appears in Fernandez-Perez et al. (2020). Other recent work has proposed endogenous sentiment proxies for non-equity markets, for example photo sentiment extracted from news images in cryptocurrency markets (Huynh and Phan, 2023).

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monetary tightening, and fundamentally altered stock-bond dynamics, provides a natural out-of-sample test.

We address this gap by answering the following two research questions:

1. Can we replicate the main findings of Edmans et al. (2022) using the identical methodology?
2. Do these weekly relationships persist in the structurally different macroeconomic environment of 2021–2024?

Our results are twofold. For 2017–2020, we successfully replicate all main findings, including the same-week effects, the reversal, the volatility link, and the flight-to-safety pattern. For 2021–2024, the picture changes substantially. Most critically, the one-week reversal, which Edmans et al. (2022) interpret as the correction of sentiment-induced mispricing, disappears entirely. The sentiment-volatility relationship and the flight-to-safety pattern also break down, corroborating that the original sentiment dynamics are not stable out of sample. We confirm this structural break through interaction tests. The pattern of results is consistent with a shift toward a more macro-dominated environment, although we cannot rule out alternative explanations such as proxy degradation or intraday compression of sentiment effects.

This study makes three key contributions. First, we provide the first replication of Edmans et al. (2022) and confirm their weekly sentiment dynamics in sample. Second, we extend the analysis to a post-COVID sample and show that these weekly dynamics do not persist. Third, we offer an interpretation linking the observed changes to the altered macroeconomic environment.

The rest of the paper is structured as follows. Section 2 describes the data and methodology. Section 3 presents the empirical results. Section 4 concludes.

2. Data and method

2.1. Data

Our replication uses the same data and sources as in the original study of Edmans et al. (2022) which analyses 40 countries between January 2017 and December 2020. We extend their study by additionally analyzing the period from January 2021 to December 2024.

The primary source for our endogenous musical sentiment measure *valence*, which measures the positivity of a song, is the Top 200 Charts from the Spotify API. As in Edmans et al. (2022), we construct the stream-weighted valence-value (SWAV) for each day in each country, and aggregate these into weekly changes of sentiment (see Online Appendix A.2 for details).

Further, we calculate USD- and local-based daily total returns for each country based on the respective MSCI Country Index and derive daily market volatility from these returns. Global returns are represented by MSCI World. Additionally, to capture heterogeneous effects on different market segments, we also download the respective MSCI Small-cap and Large-cap indices as well as 5-year government bond returns. All returns are sourced from Refinitiv.

We also assemble a set of control variables measuring weather-based (deseasonalized cloud cover, DCC) and seasonal-based (positive and negative months) sentiment, as well as risk and macroeconomic factors, measured by: Economic Policy Uncertainty Index (EPU; Baker et al., 2016), Aruoba-Diebold-Scotti Business Conditions Index (ADS; Aruoba et al., 2009), and CBOE Volatility Index (VIX). Moreover, we also obtain the COVID-19 Stringency Index (COVID) to capture the strictness of government responses (Hale et al., 2021). Definitions and sources are presented in Online Appendix A.

Finally, all variables are aggregated to the weekly frequency using Friday-to-Friday changes to avoid time-zone asynchronies and are winsorized at the 2.5th and 97.5th percentiles. Table 1 summarizes the number of observations and distribution of our variables.

2.2. Method

In a first step, like Edmans et al. (2022), we validate the music sentiment with various established sentiment influencing factors, such as seasonality, weather, and COVID-19 restrictions, for the original and our extended study period.

After establishing that link, we separately run the following main panel regression that relates music sentiment to three market outcomes: i) stock market returns, ii) stock market volatility, and iii) government bond returns. For each, we first estimate the baseline specification with a market outcome variable $Y_{i,t}$ for the original period (2017–2020) and the extended period (2021–2024):

$$Y_{i,t} = \alpha + \beta_1 MS_{i,t} + \Gamma' X_{i,t} + \varepsilon_{i,t} \tag{1}$$

where $Y_{i,t}$ denotes either (i) weekly stock index returns $RET_{i,t}$, (ii) weekly stock market volatility $VOL_{i,t}$, or (iii) the weekly return on 5-year government bonds $GOV\_RET_{i,t}$ of country i in week t. $MS_{i,t}$ denotes the music sentiment and $X_{i,t}$ is a vector of controls $\{RET_{i,t-1}\ (GOV\_RET_{i,t-1}), \overline{\Delta DCC_{i,t}}, WRET_t, VIX_t, \Delta EPU_t, \Delta ADS_t\}$ with coefficient vector Γ. The controls include the previous week's returns $RET_{i,t-1}$ ($GOV\_RET_{i,t-1}$) of stocks (bonds), the average change in deseasonalized cloud coverage $\overline{\Delta DCC_{i,t}}$ for each country i, global returns $WRET_t$, volatility VIX_t, the change in the economic policy uncertainty Index ΔEPU_t as well as the change in the business conditions ΔADS_t in week t.[2] A positive MS coefficient indicates higher returns in the same week.

For stock and government bond returns we additionally estimate specifications where the key regressor is lagged music sentiment $MS_{i,t-1}$ and the dependent variable remains the same-week return. These regressions allow us to study one-week return reversals in

[2] For our (ii) weekly stock market volatility regression, we do not use VIX as an independent variable, because it also measures volatility.

Table 1
Summary statistics.

		2017–2020				2021–2024			
Variable	N	Median	SD	P5	P95	Median	SD	P5	P95
Dependent Variables									
Country Return	8360	0.29	2.74	−4.38	4.74	0.20	2.91	−4.60	5.11
Volatility	8360	0.87	0.57	0.31	2.06	1.03	0.57	0.37	2.17
GovBonds Return	8360	0.04	0.32	−0.46	0.58	−0.03	0.62	−1.01	1.10
Independent and Control Variables									
SWAV	209	0.25	1.90	-4.13	2.87	0.25	2.67	−5.24	4.20
WRET	209	0.45	1.87	−3.57	3.11	0.35	1.94	−2.90	3.62
VIX	209	14.6	7.7	10.0	33.4	18.5	5.0	12.8	29.6
EPU	209	−2.2	62.5	−106.9	124.3	−2.1	68.3	−125.7	112.9
ADS	209	−0.02	0.50	−0.73	0.22	−0.03	0.14	−0.23	0.27
DCC	209	0.01	0.16	−0.29	0.26	0.00	0.15	−0.26	0.27

This table reports summary statistics for the main variables over 2017–2020 and 2021–2024. Returns and volatility are weekly and expressed in percent. N, SD, P5 and P95 denote the number of observations, standard deviation, and the 5th and 95th percentiles, respectively. All continuous variables are winsorized at the 2.5th and 97.5th percentiles. Variable definitions are provided in the text and Online Appendix A.

equities and bonds. For volatility, we only consider same-week music sentiment.

To formally test for a structural break in the music sentiment–market outcome relation, we pool both periods (2017–2024) and augment the baseline model with a post-2020 dummy $Post_t$ and its interaction with music sentiment:

$$Y_{i,t} = \alpha + \beta_{pre} MS_{i,t} + \delta\left(Post_t \times MS_{i,t}\right) + \phi Post_t + \Gamma' X_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $Post_t = 1$ for weeks in 2021–2024 and 0 otherwise. Here, β_{pre} captures the music sentiment effect in the original period and $\beta_{pre} + \delta$ the effect in the extended period. The term $\phi Post_t$ captures a shift in either average (i) stock index returns, (ii) market volatility, or (iii) government bond returns between the two periods that is unrelated to music sentiment. These three additional regressions with the *Post* interaction test for structural breaks in the return, volatility, and flight-to-safety channels. As above, we estimate analogous interaction specifications for lagged music sentiment $MS_{i,t-1}$ for the reversal channel in stock index returns and government bond returns.

As in Edmans et al. (2022), we also carry out a battery of robustness tests for the stock-return specification based on the baseline model (1), without Post interaction terms. Specifically, we re-estimate our main regression by (i) including same-week and lagged music sentiment in the same regression, (ii) using local-currency returns instead of USD returns, (iii) excluding the Top 50 Songs from the construction of music sentiment, (iv) replacing month fixed effects by year-month fixed effects, and (v) excluding one country at a time.[3] For all robustness regressions, we report the side-by-side results for 2017–2020 and 2021–2024 in Online Appendix C and only summarize the main insights in the text for brevity.

3. Results

3.1. Main results and robustness

We obtain for all validation variables the expected coefficients, that is, significant negative for negative months, change in cloud cover and COVID-19 restrictions, and significant positive for positive months. Regression details can be found in Online Appendix B. This analysis initially confirms the empirical validity of the proxy as a measure of collective sentiment, indicating that people do not systematically use music to regulate their mood; instead, musical sentiment actually reflects the mood.

Table 2 presents the (i) weekly stock index returns. In the original sample period (2017–2020), higher music sentiment significantly predicts higher same-week returns (+7.48, $p < 0.01$), and a reversal in the following week (–5.47, $p < 0.01$), replicating the results of Edmans et al. (2022).[4]

In our extended period (2021–2024), the same-week effect weakens considerably (+2.97, $p < 0.05$), while the lagged coefficient becomes insignificant (–0.12). This constitutes our central finding, as the one-week reversal no longer holds. In Edmans et al. (2022), the reversal provides the primary evidence for sentiment-induced temporary mispricing, and its absence in the post-2020 period suggests that the original sentiment dynamics are not stable out of sample.

The pooled regressions (Models 5–6) confirm this structural break. The interaction term Post x MS is significantly negative for

[3] Another variation of the main regression from Edmans et al. (2022) is to use daily returns and control variables, with various leaded and lagged variants. We found a very high degree of specification sensitivity of using daily music sentiment instead of weekly music sentiment. Due to the lack of robustness and replicability, we therefore did not incorporate those regressions in our findings.

[4] For brevity reasons, we only show the full model with control variables. We obtain qualitatively similar results without control variables, as in Edmans et al. (2022).

Table 2
Stock returns and music sentiment.

	2017–2020		2021–2024		2017–2024	
Variable	Same-week	Lagged	Same-week	Lagged	Same-week	Lagged
Model	(1)	(2)	(3)	(4)	(5)	(6)
MS	7.48***	−5.47***	2.97**	−0.12	7.73***	−6.28***
Post × MS					−5.38***	6.41***
Post					−0.02	−0.02
WRET	0.8956***	0.8944***	0.7666***	0.7675***	0.83***	0.83***
VIX	0.0069*	0.0069*	−0.0049	−0.005	0.0035	0.0036
ΔEPU	−0.0025***	−0.0025***	−0.0014***	−0.0014***	−0.0017***	−0.0017***
ΔADS	−0.0242	−0.0432	0.3558*	0.3473*	0.0059	−0.0056
ΔDCC	0.0401	0.0289	0.0632	0.0523	0.041	0.032
RET_{t-1}	−0.0427***	−0.0411***	−0.0167	−0.0166	−0.022**	−0.021**
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.387	0.386	0.291	0.291	0.327	0.318
Observations	8320	8280	8320	8280	16,640	16,560

This table reports panel regressions of weekly MSCI country returns on music sentiment (MS) for 2017–2020, 2021–2024, and the pooled 2017–2024 sample. The pooled specifications include a Post dummy (equal to 1 in 2021–2024) and its interaction with MS to test for a structural break. All models include country and month fixed effects and the control variables in Eq. (1). White-robust standard errors are used. *, **, *** denote significance at the 10, 5, and 1 percent levels, respectively.

same-week returns (−5.38, $p < 0.01$) and significantly positive for lagged returns (+6.41, $p < 0.01$). These coefficients effectively offset the pre-2020 effects. The net same-week effect in 2021–2024 is approximately 2.35 (= 7.73 – 5.38), while the net lagged effect is near zero (= –6.28 + 6.41 ≈ 0.13). This mirrors the period-specific estimates in Models 3–4 and confirms the predictable reversal has disappeared.

Table 3 examines the relationship between absolute music sentiment |MS| and stock market volatility. In 2017–2020, higher absolute sentiment significantly predicts greater volatility (2.27, $p < 0.01$), consistent with sentiment-driven noise trading causing prices to deviate from and then revert to fundamentals (Edmans et al., 2022). In 2021–2024, this relationship dissipates (−0.53, insignificant). The pooled regression, again, confirms the structural break: the interaction term Post x |MS| (−4.90, $p < 0.01$) nearly fully offsets the baseline effect.

Table 4 provides further supporting evidence from government bond returns. In 2017–2020, music sentiment is negatively associated with same-week government bond returns (−0.69, $p < 0.05$), replicating the flight-to-safety pattern in Edmans et al. (2022): negative sentiment leads investors to shift from risky equities to safe bonds, and vice versa.

In 2021–2024, this relationship reverses, the coefficient becomes significantly positive (1.79, $p < 0.01$). The pooled regression confirms this, the interaction term (3.33, $p < 0.01$) more than offsets the baseline effect, yielding a net positive relationship post-2020. This shift aligns with a fundamental change in asset co-movement, where the correlation between stock and government bond returns is insignificant and near zero in 2017–2020 ($p = -0.02$, $p = 0.11$), but turns significantly positive in 2021–2024 ($p = 0.18$, $p < 0.01$). This pattern is consistent with a post-COVID inflation regime where rising rates simultaneously depress both asset classes, replacing the traditional flight-to-safety dynamic.

We conduct several robustness tests following Edmans et al. (2022). For 2017–2020, nearly all specifications replicate the original findings. The same-week effect is significantly positive and the reversal significantly negative when using (i) both regressors simultaneously, (iii) year-month fixed effects, (iv) excluding the Top 50 songs, and (v) excluding one country at a time. The one exception is (ii) local currency returns, where the same-week effect remains significant but the lagged coefficient, while negative, loses significance.

For 2021–2024, the pattern again no longer holds. The same-week effect remains positive but weakens across specifications, reaching significance only in (i), (iv) and (v). More importantly, the reversal effect is absent throughout all specifications with insignificant, small coefficients around zero. Our full results are reported in Online Appendix C.

3.2. Interpretation

Table 5 provides additional evidence for interpreting the structural break documented above. We now reverse our main specification (1) and regress music sentiment on stock returns.[5] In both periods, same-week returns significantly predict sentiment, thus, when the markets perform well, people listen to more positive music. Crucially, however, the lagged relationship changes. In 2017–2020, last week's returns significantly predict this week's sentiment (0.0116, $p < 0.05$); in 2021–2024, this effect disappears (0.0053, insignificant).

[5] Edmans et al. (2022) address reverse causality through daily analysis showing sentiment temporally precedes returns, with reversal occurring on day t + 5. Our reverse specification complements this by directly testing the return-to-sentiment channel, allowing us to examine whether the feedback dynamics differ across regimes.

Table 3
Stock market volatility and music sentiment.

	2017–2020 Same-week	2021–2024 Same-week	2017–2024 Same-week
Model	(1)	(2)	(3)
|MS|	2.27***	−0.53	5.64***
Post × |MS|			−4.90***
Post			0.178***
Controls	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes
Adj. R2	0.389	0.342	0.278
Observations	8112	8112	16,432

This table reports panel regressions of weekly stock market volatility on absolute music sentiment (|MS|) for 2017–2020, 2021–2024, and the pooled 2017–2024 sample. The pooled specification includes a Post dummy (2021–2024) and its interaction with |MS| to test for a structural break in the volatility channel. All models include country and month fixed effects and the control variables in Eq. (1). White-robust standard errors are used. *, **, *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table 4
Government bond returns and music sentiment.

	2017–2020		2021–2024		2017–2024	
	Same-week	Lagged	Same-week	Lagged	Same-week	Lagged
Model	(1)	(2)	(3)	(4)	(5)	(6)
MS	−0.69**	−0.41	1.79***	0.67	−1.167***	0.042
Post × MS					3.33***	0.39
Post					−0.061***	−0.06***
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.046	0.046	0.088	0.086	0.041	0.038
Observations	5408	5408	5408	5408	10,816	10,816

This table reports panel regressions of weekly 5-year government bond index returns on music sentiment (MS) for 2017–2020, 2021–2024, and the pooled 2017–2024 sample. The pooled specifications include a Post dummy (2021–2024) and its interaction with MS to test for a structural break in the bond-return relation. All models include country and month fixed effects and the control variables in Eq. (1), including lagged government bond returns. White-robust standard errors are used. *, **, *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table 5
Returns predicting sentiment.

	2017–2020		2021–2024	
	Same-week	Lagged	Same-week	Lagged
Model	(1)	(2)	(3)	(4)
Country Return	0.0179***	0.0116**	0.0121**	0.0053
WRET	0.003	0.0139*	0.01497	0.0247***
VIX	−0.0008	−0.00046	−0.0079**	−0.0073**
ΔEPU	0.0006***	0.00066***	0.0012***	0.0011***
ΔADS	−0.187***	−0.195***	−0.2936**	−0.2898**
ΔDCC	−0.221***	−0.221***	−0.300***	−0.2997***
SWAV-1	−25.78***	−26.01***	−25.35***	−25.38***
Country FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Adj. R2	0.088	0.088	0.076	0.076
Observations	8320	8320	8320	8320

This table reports panel regressions of music sentiment on same-week and lagged weekly MSCI country returns for 2017–2020 and 2021–2024. The dependent variable is the weekly change in stream-weighted valence (*100); control variables are as in Eq. (1), and all models include country and month fixed effects. White-robust standard errors are used. *, **, *** denote significance at the 10, 5, and 1 percent levels, respectively.

This symmetric pattern (lagged effects disappearing in both directions) provides a unified interpretation of our findings. In 2017–2020, sentiment and returns were connected through a slow-moving feedback loop: sentiment-driven trading caused temporary mispricing that corrected over the following week (Table 2), absolute sentiment amplified volatility as prices deviated and reverted (Table 3), and the flight-to-safety mechanism operated independently of equity movements (Table 4). Returns, in turn, fed back into mood with a lag.

In 2021–2024, this dynamic collapses as only same-week relationships survive across all specifications. The reversal disappears, the volatility link vanishes, the bond relationship inverts, and lagged returns no longer predict sentiment. Notably, VIX, which was insignificant in 2017–2020, becomes a significant negative predictor of music sentiment in 2021–2024, suggesting that macro uncertainty may transmit directly to collective mood in the post-2020 period. This is consistent with a macro-dominated regime, where sentiment and asset prices co-move in response to common information (e.g., inflation news) rather than through persistent behavioral channels. If the initial price movement reflects rational adjustment to fundamentals rather than mispricing, no correction would follow and any remaining feedback may compress from weeks to horizons shorter than the weekly design can detect.

4. Conclusions

This study replicates Edmans et al. (2022) for 2017–2020 and extends their analysis to 2021–2024. For the original period, we confirm all original findings. Music sentiment predicts same-week stock returns followed by a reversal, absolute sentiment is related to volatility, and a flight-to-safety pattern links negative sentiment to higher government bond returns.

These patterns, however, do not persist. Our main result is that the one-week return reversal, the key signature of sentiment-induced temporary mispricing, disappears entirely in 2021–2024. Consistent with this, the sentiment-volatility link vanishes and the flight-to-safety relationship inverts. A reverse regression of the return-to-sentiment channel reveals that lagged effects disappear in both directions, as last week's returns no longer predict this week's sentiment either. This symmetric collapse of lagged relationships, combined with the shift in stock-bond correlation from near zero to significantly positive, and VIX becoming a significant predictor of music sentiment, points to a macroeconomic regime shift. In the post-COVID inflation environment, sentiment and asset prices appear to co-move in response to macro news rather than through persistent behavioral feedback channels. If initial price movements largely reflect adjustment to fundamentals rather than mispricing, no subsequent correction would be expected.

We cannot rule out complementary factors, including potential degradation of the Spotify-based proxy due to algorithm-driven music consumption, changes in listening demographics, or increasing market efficiency that compresses sentiment-driven mispricing into intraday horizons that our weekly design cannot capture.

Our findings have important practical implications. Sentiment-return patterns estimated on pre-2020 data may not generalize to different macroeconomic regimes. Researchers and practitioners relying on historical sentiment relationships should exercise caution when applying them in structurally different environments.

CRediT authorship contribution statement

Alicia Weiberg: Writing – original draft, Conceptualization, Methodology, Software, Formal analysis, Data curation. **Jan Heldmann:** Writing – original draft, Conceptualization, Methodology, Software, Formal analysis, Validation.

Competing interests

The authors declare no competing interests.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.frl.2026.110071.

Data availability

The Spotify streaming data used to construct the music sentiment measure are available upon request.

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