Part A: Interest rates and descriptive analysis

Moody's Aaa Corporate Bonds (AAA), Moody's Baa Corporate Bonds (BAA), and the Effective Federal Funds Rate (FFR) monthly data were downloaded from Federal Reserve Economic Data (FRED) database (2025), covering their earliest start dates up to December 2024, and merged into a single dataset and graphically presented (Figure 1).

Figure 1 demonstrates a time series where corporate rates (AAA, BAA) generally move together. In the same Figure, BAA yields are consistently higher than AAA yields, which is supported by Table 1's summary of basic statistics, where the mean of BAA is 7.530 and the mean of AAA is 6.553. The standard deviation of BAA of 2.958 is also higher than AAA's 2.723. This emphasises the additional default risk premium demanded by investors.

In contrast, FFR (policy rate) has a much lower long-run average, but higher relative volatility observed in Figure 1 and supported by Table 1's FFR mean value of 4.609 and standard deviation of 3.565. In Figure 1, we also see FFR spikes up to 19% in the early 1980s (Volcker's disinflation). Higher kurtosis implies that extreme values are more common than normal distribution, reflecting significant monetary policy actions against recessions and inflationary pressures, and economic volatility.

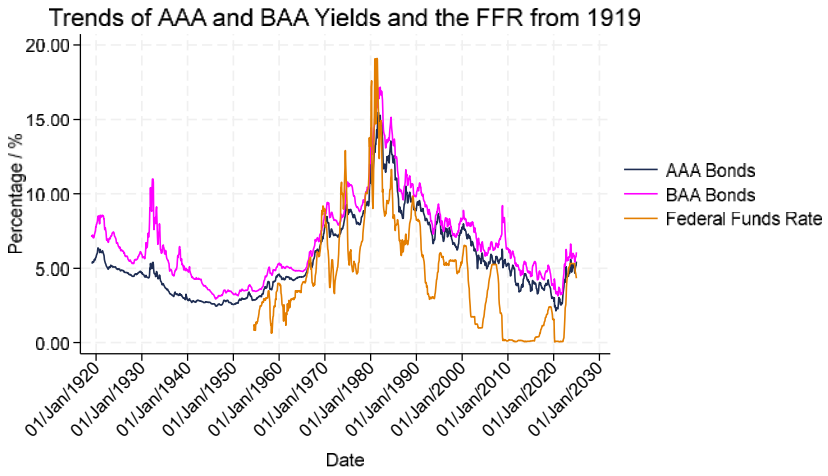

Figure 1

Table 1

Variable	*AAA (from 1954)*	*BAA (from 1954)*	*FFR*	*AAA (from 1919)*	*BAA (from 1919)*
N	847	847	847	1273	1273
Mean	6.553	7.530	4.609	5.636	6.802
Std.Dev.	2.723	2.958	3.565	2.647	2.810
Min	2.140	3.160	0.050	2.140	2.940
Max	15.490	17.180	19.100	15.490	17.180
Skewness	0.856	0.978	1.065	1.162	1.142
Kurtosis	3.388	3.722	4.639	4.125	4.394

In Table 2, the correlation across the three variables is strong**.** This reflects that while all three follow the same broad interest rate movements, default risk differences and monetary policy shifts contribute to some divergence.

Table 2

	AAA	*BAA*	*FFR*
AAA	1.000	0.992	0.860
BAA	0.992	1.000	0.835
FFR	0.860	0.835	1.000

Mishkin (2014) argues interest rate dynamics, shaped by factors like default risk premium and monetary policy, serve as sensitive indicators for economic conditions. The observed higher yields for BAA bonds reflect investors' compensation for the greater risk of default, while FFR's movements align with periods of tight or expansive monetary policy.

Part B: Corporate bond spread and macroeconomic factors

Corporate bond spread, defined as $SP_t = BAA_t - AAA_t$, is used to capture the default risk premium in corporate bonds. In addition to the spread, macroeconomic variables were collected from FRED (2025) like unemployment rate (UN_t) and the Consumer Price Index (CPIAUCSL), to compute the annualised Inflation rate (π_t) using the formula $\pi_t = \ln\left(\frac{P_t}{P_{t-12}}\right) \times 100$. Business Cycle ($Y_t$) was derived by applying Hamilton's (2018) filter to the log of Industrial Production (INDPRO) and scaling the cyclical component by 100. And a

dummy variable (D2007) marked the period, value equal to 1, for December 2007 through June 2009 to capture crisis-related shifts and equal to 0 if otherwise.

Figure 2 shows an inverse relationship between the corporate bond spread and the business cycle. Which is more noticeable during economic crisis (1930, 1984, 2008). During recessions or financial stress, the corporate bond spread widens alongside sharper spikes in the business cycle, showing economic instability and intensifying risk. When economies improve, both series revert to somewhat stable levels.

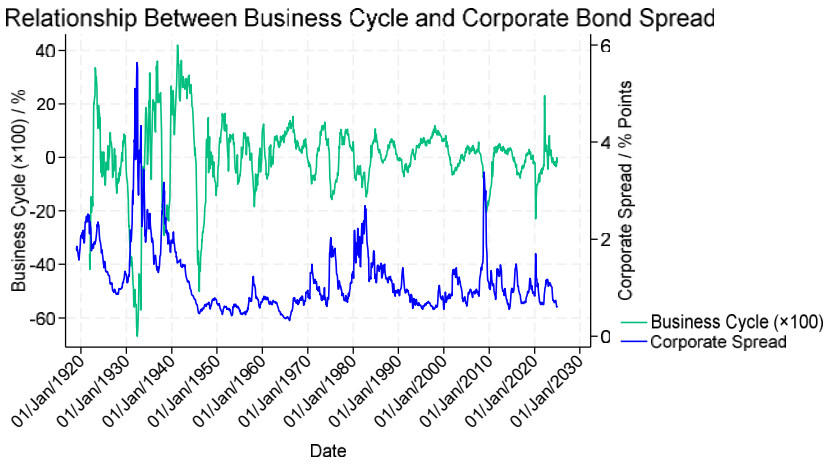

Figure 2

Table 3 presents descriptive statistics for the new variables. Corporate bonds' skewness and high kurtosis indicate outliers likely tied to market stress. The business cycle variable, with a near-zero mean and high standard deviation, reflects substantial economic fluctuations, while its slight negative skewness suggests random downturns. The inflation variable, with a mean of 3.484 and moderate skewness, shows typical inflation levels with rare deflation instances (minimum of −1.978). Lastly, the unemployment rates' mean and standard deviation imply generally stable labour market conditions, with occasional significant deterioration. These statistics emphasise the changing distributional properties of the variables, essential for the following regression analysis and understanding of economic relationships.

Table 3

Variable (from 1954)	*Corporate Bond Spread*	*Business Cycle*	*Inflation*	*Unemployment Rate*
N	847	847	847	847
Mean	0.977	-0.057	3.484	5.822
Std.Dev.	0.423	6.433	2.644	1.671
Min	0.320	-21.115	-1.978	3.400
Max	3.380	15.689	13.621	14.800
Skewness	1.868	-0.688	1.432	0.950
Kurtosis	8.141	3.177	5.260	4.179

Table 4 shows regression using the model:

$$SP_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 D2007 + \alpha_3 FFR + \alpha_4 \pi_t + \alpha_5 UN_t + \epsilon_t$$

Table 4

CORPORATE BOND SPREAD	*COEFFICIENT*	*STD. ERR.*	*T*	*P>|T|*	*[95% CONF. INTERVAL]*	
BUSINESS CYCLE	-0.0209	0.0017	-12.29	0.00	-0.0242	-0.0176
D2007	1.0159	0.0609	16.69	0.00	0.8964	1.1354
FEDFUNDS	0.0347	0.0036	9.56	0.00	0.0276	0.0418
INFLATION	0.0188	0.0048	3.94	0.00	0.0094	0.0282
UNEMPLOYMENT RATE	0.0878	0.0064	13.70	0.00	0.0753	0.1004
CONSTANT (INTERCEPT)	0.2160	0.0386	5.59	0.00	0.1403	0.2918

The model produced an R^2-value of 0.633, which means the model explains about two-thirds of the spread.

What the regression results in Table 4 indicate for each variable:

- Business Cycle (Y_t): Negative coefficient, aligning with Mishkin (2014), indicates that stronger economic conditions (higher cyclical output) reduce default risk premiums, narrowing the corporate spread. Standard macro-finance theory states that robust growth usually correlates with fewer defaults and lower perceived risk.

- Financial crisis dummy (D2007): Coefficient is positive and highly significant, confirming the sharp corporate bond spreads during the financial crisis, and suggests that this period introduced systemic risk beyond the usual cyclical movement.

- FFR, Inflation (π_t), and Unemployment (UN_t) are all positive, showing a consistent view that tighter monetary policy, heightened inflation, or increased unemployment increase the default risk premium on corporate bonds.

Econometrically, the variables are highly significant ($p < 0.01$), with t-statistics well above conventional thresholds. The coefficients align with Mishkin's (2014) macro-finance theory, indicating that stronger economic activity narrows corporate bond spreads while weaker economic activity widens them. Ceteris paribus, such alignment between theory and evidence improves confidence in the model's explanatory power.

However, from the R^2-value, about a third of the corporate bond spread is not explained by this model. First, the model may omit variables such as financial market sentiment, global risk aversion, or additional policy measures that can influence corporate spread, which is somewhat discussed by Collin-Dufresne et al. (2001), where omissions of critical variables can result in biased estimates. Second, using a single crisis dummy for 2007–09 may oversimplify the severity and timing of financial crises by overlooking heterogeneity across the crisis phases, instead, the crisis dummy variable could have included other recessionary periods. Finally, a linear specification may not fully capture the nonlinearities usually associated with extreme market stress. Despite limitations, overall consistency of the findings upholds Part A results, emphasising that default risk premiums consistently widen during recessions or financial crises.

Part C: Corporate bond spread during the COVID-19 pandemic

In early 2020, COVID-19 rapidly altered employment, inflation expectations, and risk perceptions. In Figure 3, corporate bond spread reveals a sharp spread jump in early 2020, as investors demand higher default risk premiums during uncertainty. At the same time, unemployment rates exceeded 10% mid-2020 (paralleling the 2007–09 crisis in Figure 4), highlighting economic decline.

Policies such as near-zero FFR in March 2020 (Figure 1) helped maintain a healthy corporate bond market as the corporate bond spread began to normalise by 2021–2022, even as inflationary pressures persisted, likely due to a decrease in uncertainty along near-zero FFR. This pattern reinforces Mishkin's (2014) theory on the sensitivity of default spreads to cyclical and crisis conditions and demonstrates how timely, expansionary policy measures can mitigate undesirable market dynamics.

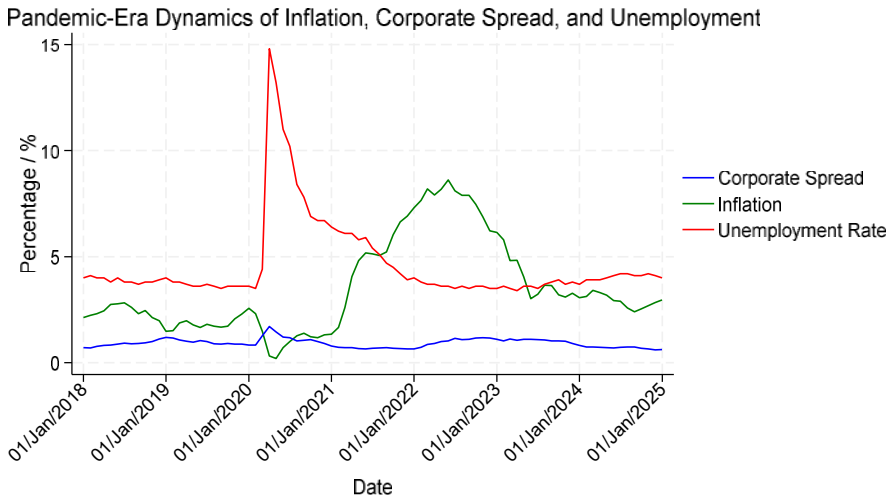

Figure 3

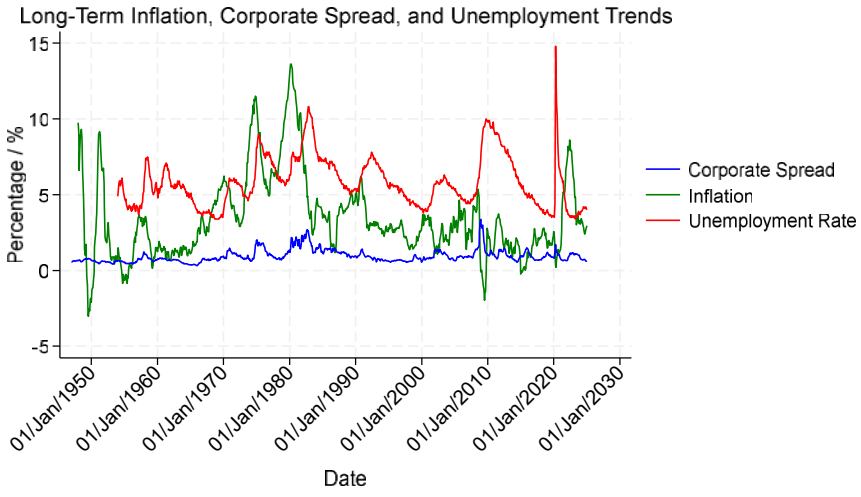

Figure 4

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