

Coronavirus: Impact on Stock Prices and Growth Expectations

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Abstract

In this project, we aim to replicate and validate the findings from the study Coronavirus: Impact on Stock Prices and Growth Expectations [Gormsen and Koijen \(2020\)](#). Our primary goal is to reproduce the results presented in Figure 1, Figure 5, and Table 1. However, we discovered that Figure 5 and Table 1 rely on OTC market data. According to the original paper Equity Yields by [Van Binsbergen et al. \(2013\)](#), data prior to 2008 was sponsored by Goldman Sachs and BNP Paribas. After we contacted Professor Ralph Koijen for access to this dataset but were denied, we shifted our approach to use data from 2008 onward.

Because the S&P dividend futures market data on Bloomberg only dates back to 2015, we have even fewer data points for our analysis. Nonetheless, our findings show trends consistent with the original study, and we are satisfied with the progress made so far.

1 Introduction

This project replicates the pivotal findings in the article. Our objective is to replicate Figure 1, Figure 5 and Table 1. Utilizing Bloomberg data for S&P 500 dividend futures and index data, we not only include analysis from January 2020 to August 2020 time frame, but also include data up to March 2025. This replication effort not only underscores the importance of empirical validation in financial research but also confronts the challenges of data availability and methodological adaptation inherent in such scholarly pursuits.

2 Replicated Figure 1

After we pulled market indices data for the covid period we are interested in, we did the following data transformation to calculate prices from the 30 year yield.

$$\text{Price} = \frac{100}{(1 + \times \text{Yield})^{30}}.$$

See the replicated graph:

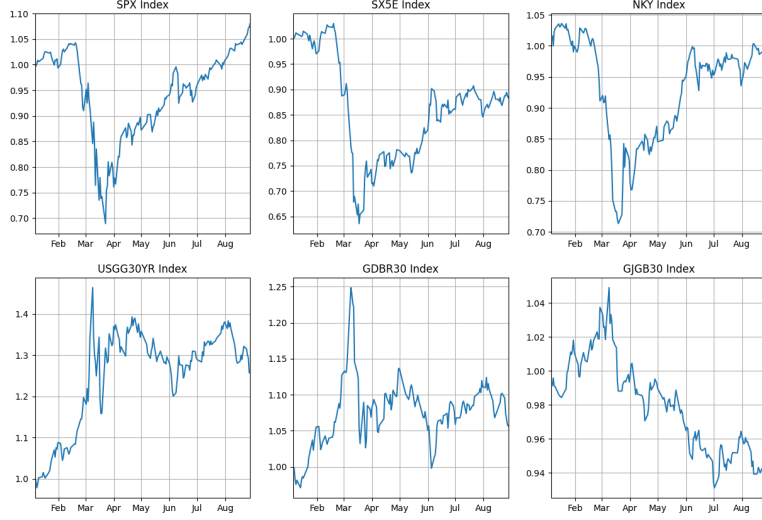


Figure 1: Replicated Figure 1

3 Methodology for Figure 5 and Table 1

The regression we ran for Table 1 is as follows:

$$e_{it}^{(n)} = \frac{1}{n} \ln\left(\frac{D_t}{F_t^{(n)}}\right)$$

where n is measured in years. So we later run a pooled regression of realized dividend growth rates on the S&P 500, the Euro Stoxx 50, and Nikkei 225 onto the 2-year realized yield of the associated index.

$$\Delta_1 D_{i,t} = \beta_{0i}^D + \beta_1^D e_{it}^{(2)} + \epsilon_{i,t+4},$$

where t is measured in quarters, and i refers to either S&P 500, the Euro Stoxx 50, and Nikkei 225

4 Replication for Table 1 and Figure 5

See the replicated table 1:

Table 1: Predictive Regressions of Dividend Growth on Dividend Yields

	Intercept	EU dummy	Nikkei 225 dummy	$e_{it}^{(2)}$	R^2	# Obs
$\Delta_1 D_{i,t}$	4.315 (1.158)	0.007 (0.03)	0.043 (0.03)	-23.25 (18.79)	0.04	79

This table shows results from regressions similar to (3). In a pooled sample across S&P 500, Euro Stoxx 50, and Nikkei 225, we regress realized dividend growth onto the ex-ante two-year yield and a dummy equal to 1 for Euro Stoxx 50 observations and a dummy equal to 1 for Nikkei 225 observations. HAC standard errors are presented in parenthesis. Observations are quarterly.

Given that we don't have that many data points (original paper has 143 data points), we've seen a much lower R-squared number. Later then we use those parameters to replicate figure 5, which shows the dynamics of expected dividend growth in the US, EU and Japan.

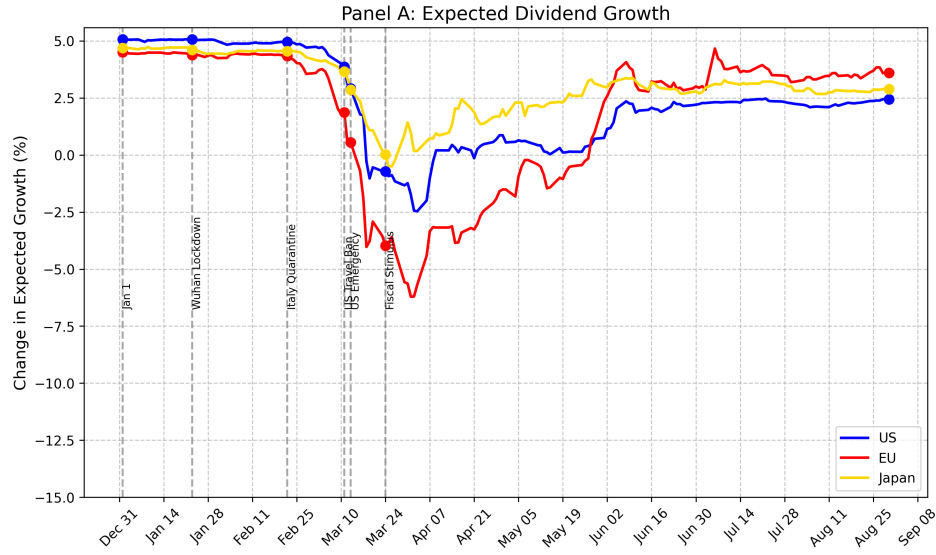


Figure 2: Replicated Figure 5 first panel with events timeline

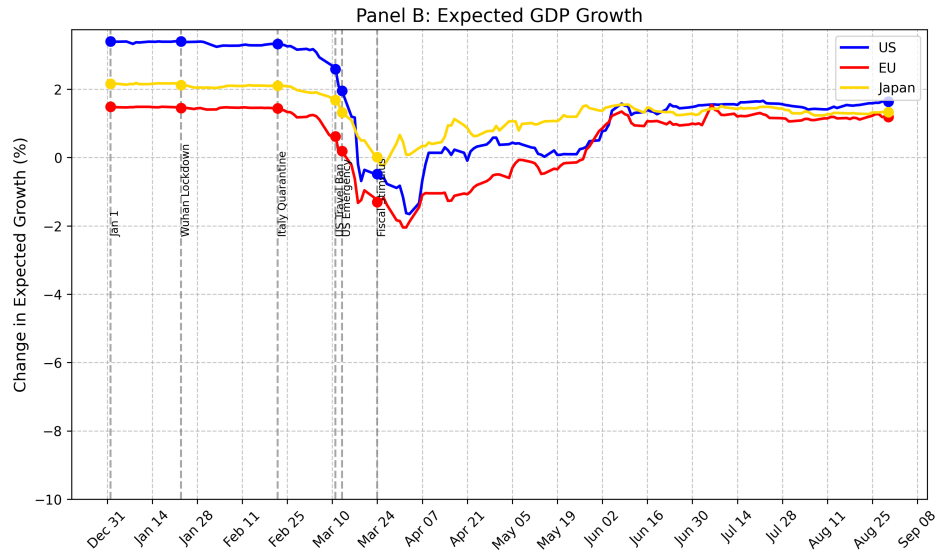


Figure 3: Replicated Figure 5 second panel with events timeline

Even though the parameter estimates were quite different, graph shows very similar trend to what was presented in the paper. So we later extend this to the current market status.

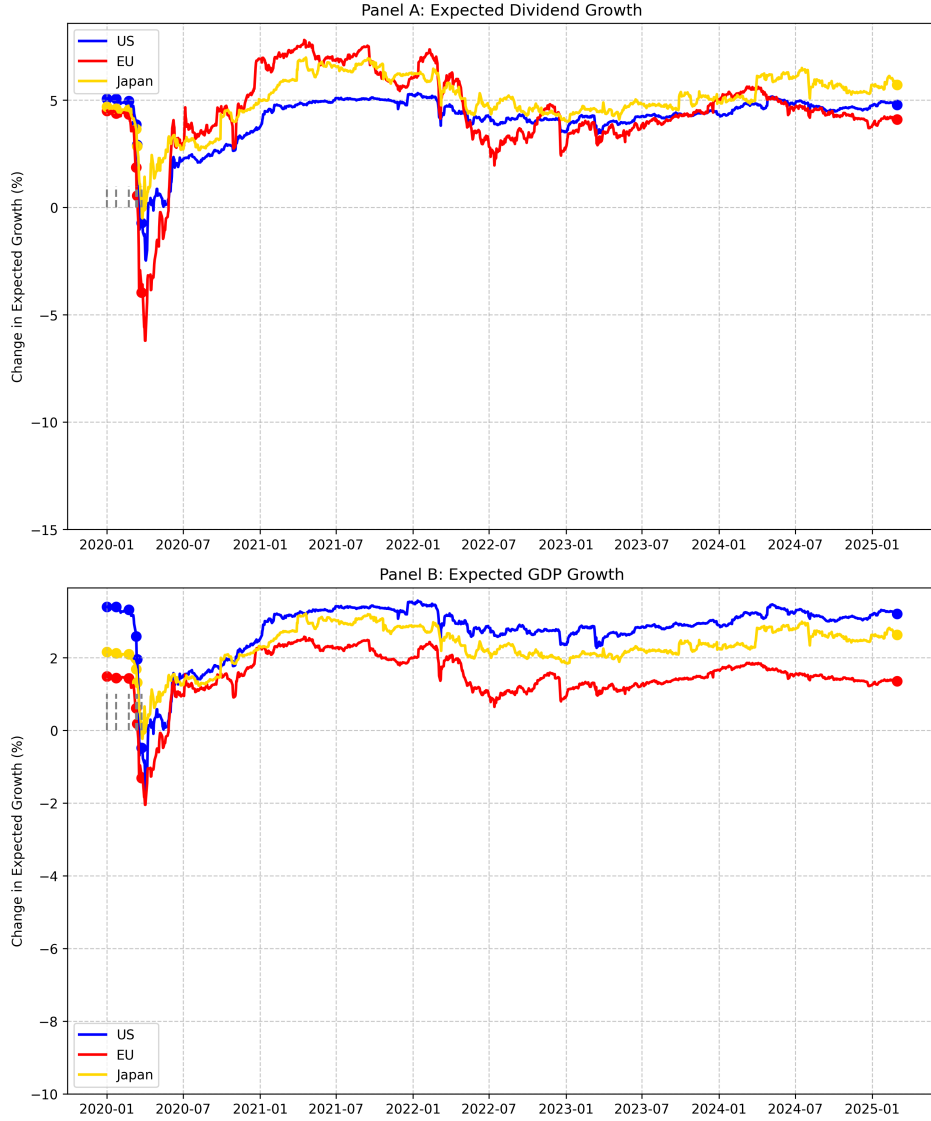


Figure 4: Replicated Figure 5 until now

5 Additional Summary Stats

We also created summary statistics for the three source data's daily returns: S&P 500 Index, Euro Stoxx 50, and Nikkei 225 so that our reader can better understand those three markets on a broader level.

Table 2: Summary Statistics for Source Data

Paper Sample: from 2020 January to 2020 August	count	mean	std	min	25%	50%	75%	max
US Stock Market Index	152	0.95	0.09	0.69	0.89	0.96	1.01	1.08
Euro Stoxx 50 Index	152	0.86	0.10	0.64	0.77	0.87	0.90	1.03
Nikkei 225 Index	152	0.93	0.08	0.71	0.87	0.97	0.99	1.04
US 30-Year Gov Bond	152	1.25	0.12	0.98	1.20	1.29	1.33	1.46
German 30-Year Gov Bund	152	1.08	0.05	0.97	1.05	1.08	1.10	1.25
Japanese 30-Year Gov Bond	152	0.98	0.03	0.93	0.95	0.98	1.00	1.05

6 Successes and Challenges

In our efforts to replicate the original study, we closely followed its methodology and logic. Our automated data extraction process proved especially valuable, allowing us to retrieve data in a manner consistent with the original authors' approach. Despite the absence of OTC market data, we were still able to produce Figure 5 and Table 1, demonstrating similar trends to those reported in the study.

References

- Gormsen, N. J. and Koijen, R. S. (2020). Coronavirus: Impact on stock prices and growth expectations. *The Review of Asset Pricing Studies*, 10(4):574–597.
- Van Binsbergen, J., Hueskes, W., Koijen, R., and Vrugt, E. (2013). Equity yields. *Journal of Financial Economics*, 110(3):503–519.