Erratum
for
Dividend Dynamics, Learning, and Expected Stock Index Returns

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We discovered inconsistencies in our coding for Jagannathan and Liu (2019) that, after addressed, has led to changes in the tables and figures that we reported. These changes do not in anyway affect any of the paper's statements, findings, or conclusions. We report updated tables and figures in this erratum and highlight any statistics where the change is nontrivial by underlining it.

The inconsistencies are as follows:

- In the paper, we mention that our Kalman filter estimation is based on non-overlapping annual dividend data. However, in the codes we used a mixure of non-overlapping and overlapping regressions to estimate parameters and state variables in the AR[1] processes of earnings-to-dividend ratios and inflation rates. Here, we correct this inconsistency, and use non-overlapping data throughout all parts of the paper.
- In Table III and Table V in Section I of the paper, we had accidentally lagged the right side variable by six months while estimating the model. This error has now been corrected.
- In Figure 7 of the paper, we forgot to specify, when reporting summary plots for earnings-to-dividend ratios and inflation rates, that these plots were for the variables de-meaned. Here, we report the figure without de-meaning.
- In estimating expected returns from the long-run risks model, we accidentally mistook inflation lagged by one year as current inflation in some parts of our coding. This has been corrected.

The nontrivial changes are: In Table III (and V), the out-of-sample R-Square for our dividend model drops from 0.413 (0.395) to 0.320 (0.331), but remains statistically higher than the corresponding R-Squares of competing models. Return predictability R-Square for the full learning model in Table IX increases from 0.271 to 0.291 for the full data sample, in Table XI increases during expansions from 0.191 to 0.252, and decreases during recessions from 0.641 to 0.474. These changes do not change the main conclusions in the paper. The Internet Appendix to the paper gives the data, and the Matlab and Stata codes used in generating the Tables and Figures.

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van Binsbergen, Jules H., and Ralph S.J. Koijen, 2010, Predictive regression: A present-value approach, Journal of Finance 65, 1439–1471.

Table III
Dividend Growth Rates and Expected Growth Rates

Panel A reports R^2s for predicting dividend growth rates using our dividend model, the latent variable model in van Binsbergen and Koijen (2010), the VAR model in Campbell and Shiller (1988b), or the Markov-switching model in Johannes et al. (2016). The first column reports in-sample R^2s. The second and third columns report out-of-sample R^2s and the corresponding p-values. Panel B reports incremental R^2s for predicting dividend growth rates using our model over one of the baseline models. Dividends are estimated based on nonoverlapping annual data since 1946. Out-of-sample statistics are based on nonoverlapping annual data between 1975 and 2016. The numbers that change nontrivially are underlined.

Panel A. In-Sample and Out-of-Sample R^2

	In-Sample	Out-of-Sample	
	$\mathcal{R}^2$	$\mathcal{R}^2_{\mathcal{O}}$	p-val.
Our Model	0.464	<u>0.320</u>	0.000
van Binsbergen and Koijen (2010)	0.174	0.161	0.008
Campbell and Shiller (1988b)	0.278	0.256	0.001
Johannes et al. (2016)	0.137	-0.042	1.000

Panel B. Incremental R^2

	Out-of-Sample	
	$\mathcal{R}^2_{\mathcal{I}}$	p-val.
van Binsbergen and Koijen (2010)	0.189	0.004
Campbell and Shiller (1988b)	0.086	0.059
Johannes et al. (2016)	0.348	0.000

Table V
Dividend Growth Rates and Expected Growth Rates (Real Rates)

Panel A reports R^2s for predicting (real) dividend growth rates using our dividend model, the latent variable model in van Binsbergen and Koijen (2010), the VAR model in Campbell and Shiller (1988b), or the Markov-switching model in Johannes et al. (2016). The first column reports in-sample R^2s. The second and third columns report out-of-sample R^2s and the corresponding p-values. Panel B reports incremental R^2s for predicting dividend growth rates using our model over one of the baseline models. Dividends are estimated based on nonoverlapping annual data since 1946. Out-of-sample statistics are based on nonoverlapping annual data between 1975 and 2016. The numbers that change nontrivially are underlined.

Panel A. In-Sample and Out-of-Sample R^2

	In-Sample	Out-of-Sample	
	$\mathcal{R}^2$	$\mathcal{R}^2_{\mathcal{O}}$	p-val.
Our Model	0.424	<u>0.331</u>	0.000
van Binsbergen and Koijen (2010)	0.160	0.146	0.012
Campbell and Shiller (1988b)	0.257	0.242	0.001
Johannes et al. (2016)	0.172	-0.058	1.000

Panel B. Incremental R^2

	Out-of-Sample	
	$\mathcal{R}^2_{\mathcal{I}}$	p-val.
van Binsbergen and Koijen (2010)	0.292	0.000
Campbell and Shiller (1988b)	0.210	0.002
Johannes et al. (2016)	0.428	0.000

Table VII
Stock Index Returns and Stock Yields

This table reports coefficient estimates and R^2s from regressing future stock index returns on log price-to-dividend ratios and stock yields, computed using our dividend model, the latent variable model in van Binsbergen and Koijen (2010) (vBK), the VAR model in Campbell and Shiller (1988b) (CS), or the Markov-switching model in Johannes et al. (2016) (JLM) and assuming investors either learn (i.e., $sy_t(\mathcal{L})$), or do not learn (i.e. $sy_t(\mathcal{F})$), about dividends. Dividends are estimated based on nonoverlapping annual data since 1946. Regressions are based on nonoverlapping annual data between 1975 and 2016. Reported in parentheses are Newey and West (1987) standard errors that account for up to 10 years of serial correlation. Estimates significant at the 90%, 95%, and 99% confidence levels are indicated using $*$, $**$, and $***$. The numbers that change nontrivially are underlined.

		Our Model				Baseline Model vBK	Baseline Model CS	Baseline Model JLM
$p_t - d_t$	-0.130***			0.004				
	(0.035)			(0.069)				
$sy_t(\mathcal{L})$		4.627***		4.716**	5.656***	3.379***	4.160***	1.965**
		(0.799)		(1.910)	(1.942)	(0.850)	(1.216)	(0.843)
$sy_t(\mathcal{F})$			3.957***		-1.191			
			(0.975)		(1.946)			
$\mathcal{R}^2$	0.136	0.191	0.133	0.191	0.194	0.114	0.114	0.054

Table VIII
Stock Index Returns and Shocks to Dividend Expectations

This table reports coefficient estimates and R^2s from regressing future stock index returns on contemporaneous shocks to long-run dividend growth rate expectations, computed using our dividend model, the latent variable model in van Binsbergen and Koijen (2010) (vBK), the VAR model in Campbell and Shiller (1988b) (CS), or the Markov-switching model in Johannes et al. (2016) and assuming investors either learn (i.e. $\Delta\partial_{t+1}(\mathcal{L})$), or do not learn (i.e. $\Delta\partial_{t+1}(\mathcal{F})$), about dividends. Dividends are estimated based on nonoverlapping annual data since 1946. Regressions are based on nonoverlapping annual data between 1975 and 2016. Reported in parentheses are Newey and West (1987) standard errors that account for up to 10 years of serial correlations. Estimates significant at the 90%, 95%, and 99% confidence levels are indicated using $*$, $**$, and $***$. The numbers that change nontrivially are underlined.

	Our Model		Baseline Model vBK	Baseline Model CS	Baseline Model JLM
$\Delta\partial_{t+1}(\mathcal{L})$	8.251***		-1.800	0.229	-4.183**
	(2.738)		(4.147)	(6.782)	(1.787)
$\Delta\partial_{t+1}(\mathcal{F})$		-1.868			
		(4.282)			
$\mathcal{R}^2$	0.107	0.001	0.002	0.000	0.030

Table IX

Stock Index Returns and Epstein and Zin (1989) Expected Returns

This table reports out-of-sample R^2s for predicting stock index returns using our long-run risks model, assuming investors have full information, learn about dividends, or learn about all parameters in our long-run risks model (i.e. full learning), and the corresponding bootstrap simulated p-values. Also reported are incremental out-of-sample R^2s for predicting stock index returns assuming learning over predicting returns assuming full information. Dividends are estimated based on nonoverlapping annual data since 1946. Statistics are based on nonoverlapping annual data between 1976 and 2015. The numbers that change nontrivially are underlined.

			Incremental	
	$\mathcal{R}^2$	p-val.	$\mathcal{R}^2_{\mathcal{I}}$	p-val.
Full Info.	0.148	0.012		
Learning about Dividends	0.261	0.001	0.133	0.017
Full Learning	0.291	0.000	0.168	0.007

Table XI

Return Predictability during Expansions versus Recessions

This table reports out-of-sample R-square values for predicting stock index returns using our long-run risks model, assuming investors have full information, learn about dividends, or learn about all parameters in our long-run risks model, that is, full learning, and the corresponding bootstrap simulated p-values. Also reported are incremental out-of-sample R-square values for predicting stock index returns assuming learning over assuming full information. Statistics are based on non-overlapping annual data between 1975 and 2016 and are separately reported for expansions versus recessions. A year is in recession if any of its months overlap with NBER recession dates. The numbers that change nontrivially are underlined.

	Expansion				Recession			
			Incremental				Incremental	
	$\mathcal{R}^2$	p-val.	$\mathcal{R}^2_{\mathcal{I}}$	p-val.	$\mathcal{R}^2$	p-val.	$\mathcal{R}^2_{\mathcal{I}}$	p-val.
Full Info.	0.140	0.024			0.185	0.377		
Learning about Dividends	0.212	0.005	0.084	0.086	0.490	0.098	0.373	0.174
Full Learning	0.252	0.002	0.131	0.030	0.474	0.106	0.354	0.189

Table AII
Dividend Growth Rates and Expected Growth Rates
(Quarterly, Semi-Annual, and Bi-Annual Rates)

Panel A reports R^2s for predicting dividend growth rates (quarterly, semiannual, or biannual rates), computed using our dividend model, the latent variable model in van Binsbergen and Koijen (2010), the VAR model in Campbell and Shiller (1988b), or the Markov-switching model in Johannes et al. (2016). The first column reports in-sample R-square values. The second and third columns report out-of-sample R-square values and the corresponding p-values. Panel B reports incremental R^2s for predicting dividend growth rates using our model over one of the baseline models. Dividends are estimated based on non-overlapping annual data since 1930. Out-of-sample statistics are based on nonoverlapping quarterly, semiannual, or biannual data between 1975 and 2016. The numbers that change nontrivially are underlined.

Panel A. Out-of-Sample R^2

	Quarterly		Semi-Annual		Bi-Annual	
	$\mathcal{R}^2_{\mathcal{O}}$	p-val.	$\mathcal{R}^2_{\mathcal{O}}$	p-val.	$\mathcal{R}^2_{\mathcal{O}}$	p-val.
Our Model	$\underline{0.542}$	0.000	$\underline{0.498}$	0.000	$\underline{0.273}$	0.014
van Binsbergen and Koijen (2010)	0.337	0.000	0.267	0.000	0.151	0.080
Campbell and Shiller (1988b)	0.333	0.000	0.303	0.000	0.262	0.017
Johannes et al. (2016)	0.076	0.000	0.001	0.766	-0.034	1.000

Panel B. Incremental R^2

	$\mathcal{R}^2_{\mathcal{I}}$	p-val.	$\mathcal{R}^2_{\mathcal{I}}$	p-val.	$\mathcal{R}^2_{\mathcal{I}}$	p-val.
van Binsbergen and Koijen (2010)	0.309	0.000	0.315	0.000	0.143	0.089
Campbell and Shiller (1988b)	0.312	0.000	0.280	0.000	0.014	0.603
Johannes et al. (2016)	0.505	0.000	0.498	0.000	0.297	0.010

Table AIII
Stock Index Returns and Stock Yields
(Quarterly, Semi-Annual, and Bi-Annual Rates)

This table reports coefficient estimates and R^2s from regressing future stock index returns (quarterly, semiannual, or biannual returns) on log price-to-dividend ratios and stock yields computed using our dividend model, the latent variable model in van Binsbergen and Koijen (2010) (vBK), the VAR model in Campbell and Shiller (1988b) (CS), or the Markov-switching model in Johannes et al. (2016) (JLM) and assuming investors either learn (i.e. $sy_t(\mathcal{L})$) or do not learn (i.e. $sy_t(\mathcal{F})$) about dividends. Dividends are estimated based on nonoverlapping annual data since 1930. Regressions are based on nonoverlapping quarterly, semiannual, or biannual data between 1975 and 2016. Reported in parentheses are Newey and West (1987) standard errors that account for up to 10 years of serial correlation. Estimates significant at the 90%, 95%, and 99% confidence levels are indicated using $*$, $**$, and $***$. The numbers that change nontrivially are underlined.

		Our Model		Baseline Model		
	$p_t - d_t$	$sy_t(\mathcal{L})$	$sy_t(\mathcal{F})$	vBK	CS	JLM
Quarterly	-0.034***	0.970***	1.101***	0.857***	1.173***	0.384
	(0.009)	(0.220)	(0.284)	(0.232)	(0.310)	(0.239)
$\mathcal{R}^2$	0.032	0.034	0.033	0.026	0.026	0.007
Semi-Annual	-0.065***	1.771***	2.137***	1.686***	2.311***	0.912
	(0.016)	(0.447)	(0.531)	(0.415)	(0.614)	(0.480)
$\mathcal{R}^2$	0.069	0.070	0.072	0.058	0.060	0.022
Bi-Annual	-0.281***	9.850***	9.311***	7.786***	9.011***	4.868**
	(0.073)	(2.292)	(2.341)	(1.986)	(2.799)	(1.884)
$\mathcal{R}^2$	0.258	0.307	0.263	0.231	<u>0.154</u>	0.120

Table AIV

Stock Index Returns and Epstein and Zin (1989) Expected Returns (Quarterly, Semiannual, and Biannual Rates)

This table reports out-of-sample R^2s for predicting stock index returns (quarterly, semiannual, or biannual returns) using our long-run risks model, assuming investors have full information, learn about dividends, or learn about all parameters in our long-run risks model (i.e. full learning), and the corresponding p-values. Also reported are incremental out-of-sample R^2s for predicting stock index returns assuming learning over predicting returns assuming full information. Dividends are estimated based on nonoverlapping annual data since 1930. Statistics are based on nonoverlapping quarterly, semiannual, or biannual data between 1975 and 2016. The numbers that change nontrivially are underlined.

			Incremental	
Quarterly	$\mathcal{R}^2$	p-val.	$\mathcal{R}^2_{\mathcal{I}}$	p-val.
Full Info.	<u>0.026</u>	0.299		
Learning about Dividends	<u>0.086</u>	0.056	0.061	0.109
Full Learning	<u>0.109</u>	0.031	0.085	0.058
Semi-Annual				
Full Info.	<u>0.135</u>	0.015		
Learning about Dividends	<u>0.228</u>	0.001	0.108	0.031
Full Learning	<u>0.278</u>	0.000	0.165	0.007
Bi-Annual				
Full Info.	<u>0.279</u>	0.011		
Learning about Dividends	<u>0.382</u>	0.002	0.143	0.081
Full Learning	<u>0.431</u>	0.001	0.211	0.031

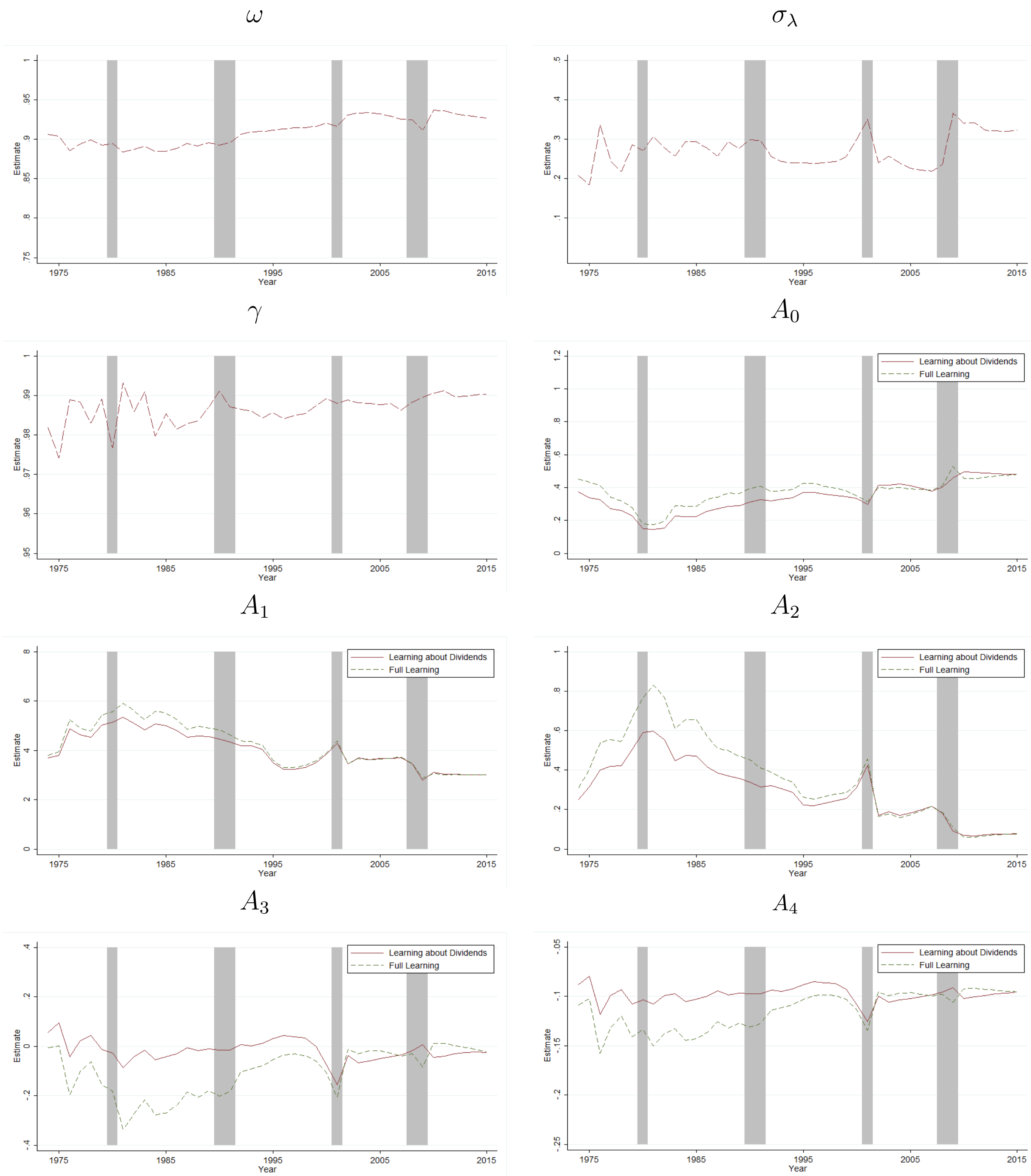


Figure 5. Evolution of long-run risks model parameter and coefficient estimates over time. This figure plots estimates of the parameters in our long-run risks model, aside from those in the dividend process, and coefficients $A.$ that relates price-to-dividend ratios, the latent variable x_t, the retention ratio, and the inflation rate to expected returns, assuming that these parameters are estimated based on data up to time τ for τ between 1975 and 2016. The shaded regions are recessions. A year is in recession if any of its months correspond to NBER recession dates. Although all figures change somewhat, the discussions on these patterns do not change.

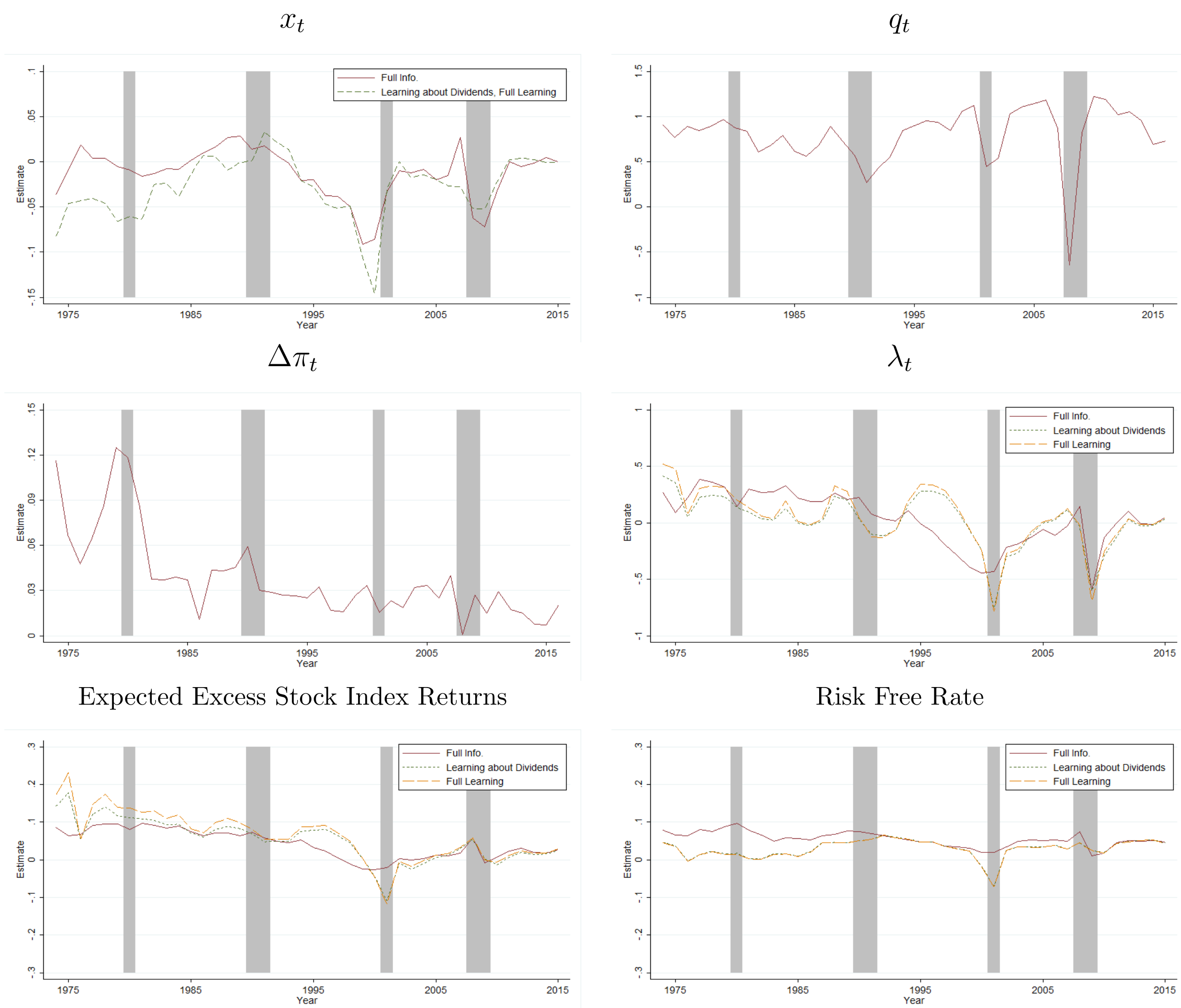
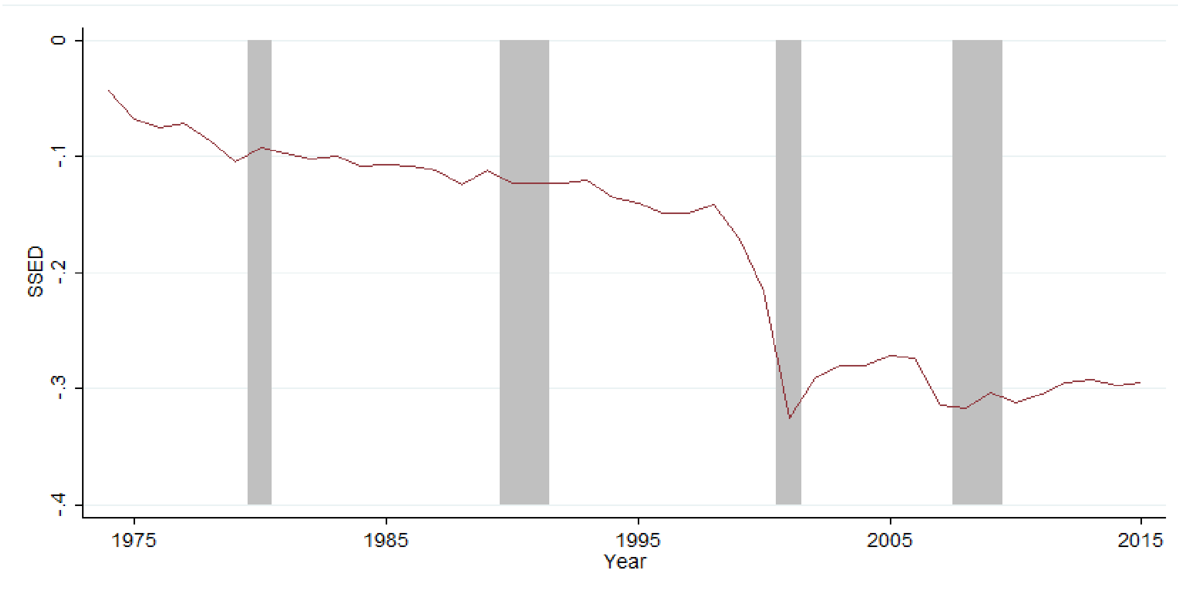
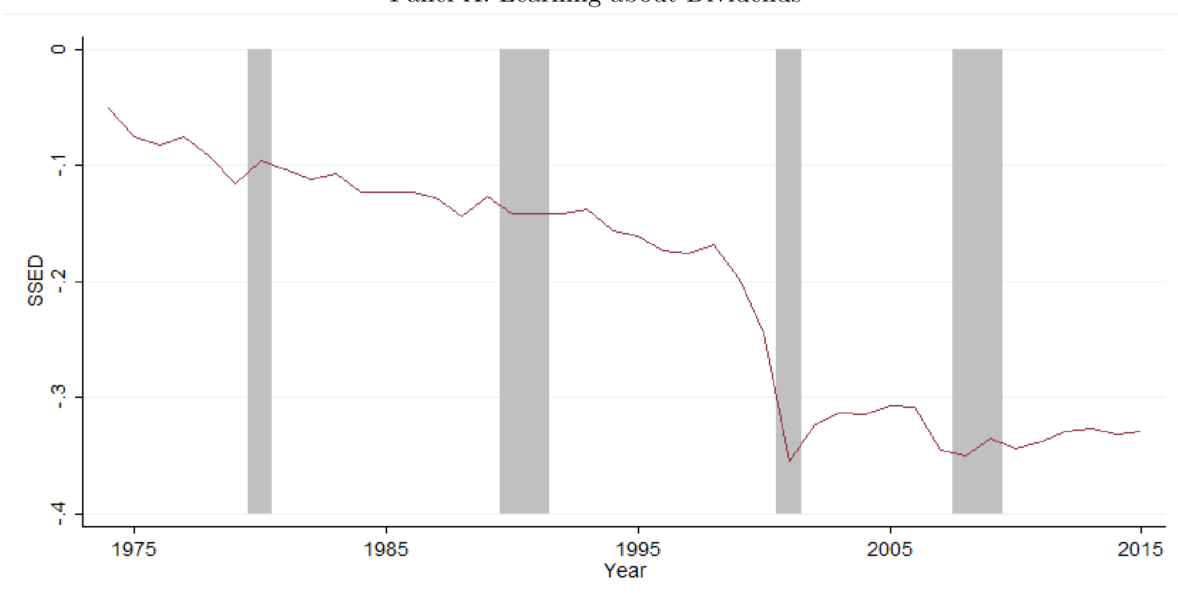


Figure 6. Evolution of long-run risks model state variables, expected excess stock index returns, and risk-free rate over time. This figure plots estimates of the state variables for our long-run risks model, as well as expected excess returns and the risk-free rate from our model, assuming full information, learning about dividends, or learning about all parameters in our long-run risks model (i.e. full learning), between 1975 and 2016. The shaded regions are recessions. A year is in recession if any of its months correspond to NBER recession dates. Although all figures change somewhat, the discussions on these patterns do not change.

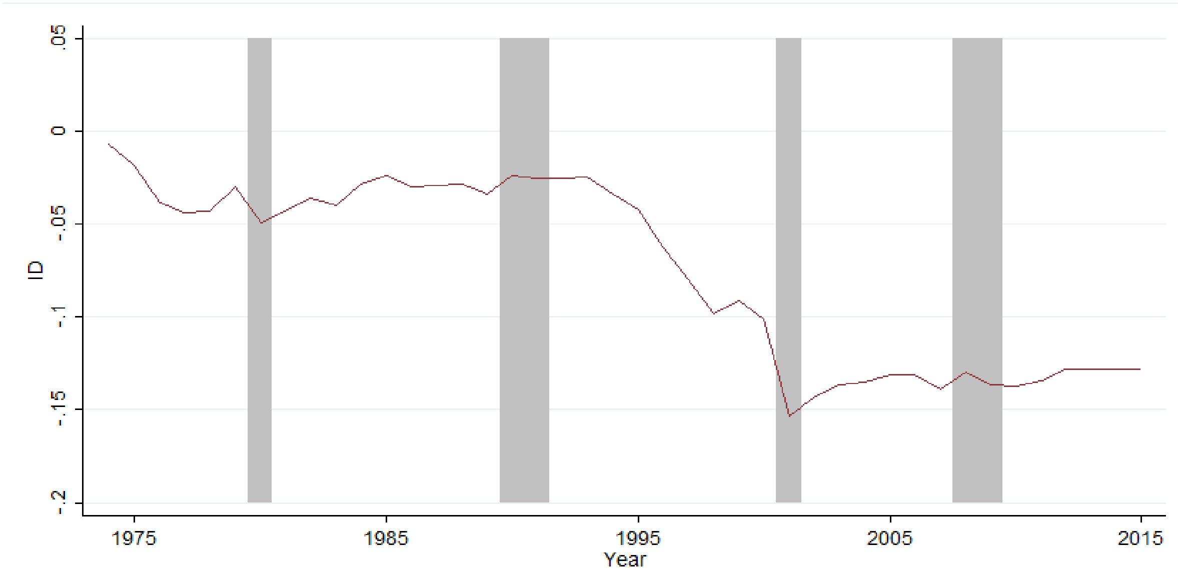


Panel A. Learning about Dividends

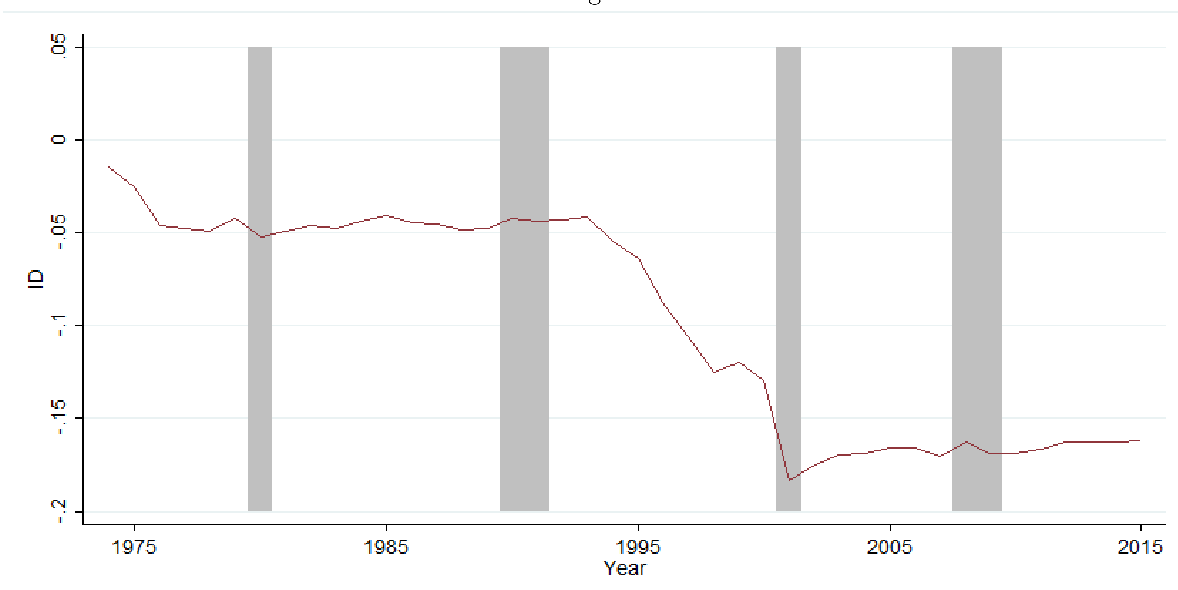


Panel B. Full Learning

Figure 7. Cumulative sum of squared errors difference. Panel A plots the cumulative sum of squared errors difference (SSED) of our long-run risks model, assuming learning about dividends, in predicting stock index returns. Panel B plots the SSED of our long-run risks model, assuming learning about all parameters in our long-run risks model (i.e. full learning). Dividends are estimated based on nonoverlapping annual data since 1946. Statistics are based on nonoverlapping annual data between 1975 and 2016. The shaded regions are recessions. A year is in recession if any of its months correspond to NBER recession dates. Although all figures change somewhat, the discussions on these patterns do not change.



Panel A. Learning about Dividends



Panel B. Full Learning

Figure 8. Incremental gain in cumulative sum of squared errors difference from learning. Panel A plots the incremental gain in the cumulative sum of squared errors difference (SSED) of our long-run risks model, assuming learning about dividends versus full information. Panel B plots the incremental gain in SSED of our long-run risks model, assuming learning about all parameters in our long-run risks model (i.e. full learning), versus full information. Dividends are estimated based on nonoverlapping annual data since 1946. Statistics are based on nonoverlapping annual data between 1976 and 2015. The shaded regions are recessions. A year is in recession if any of its months correspond to NBER recession dates. Although all figures change somewhat, the discussions on these patterns do not change.