Online Appendix

We sort 55 years from 1964 to 2018 into a dichotomy, terciles, quartiles, or quintiles, based on ΔTFP or ΔGDP. Change in total factor productivity $\Delta lnTFP$ is $\Delta lnY - \alpha\Delta lnK - (1-\alpha)\Delta lnL$ is estimated by Fernald (2012). ΔGDP is the real GDP growth, adjusted based on an AR(1) process. We run the cross-sectional pricing test for the highest and the lowest states separately. In each month, we estimate the following cross-sectional regression: $RET_{m,i} = \vartheta_{0m} + \vartheta_{1m}\hat{\beta}_{TFP,t,i} + \vartheta_{2m}\hat{\beta}_{Wealth,t,i} + \varepsilon_{\vartheta,m,i}$. We report the average regression adjusted R^2 and the p-value for the difference in the adjusted R^2.

Panel A

Sort years into…	Dichotomy	Tercile	Quartile	Quintile
Highest ΔTFP State Adj. R^2	0.72%	0.89%	0.98%	1.07%
Lowest ΔTFP State Adj. R^2	0.55%	0.59%	0.53%	0.53%
P-value for the diff.	<0.01	<0.01	<0.01	<0.01

Panel B

Sort years into…	Dichotomy	Tercile	Quartile	Quintile
Highest ΔGDP State Adj. R^2	0.67%	0.81%	0.92%	1.09%
Lowest ΔGDP State Adj. R^2	0.60%	0.58%	0.66%	0.67%
P-value for the diff.	<0.01	<0.01	<0.01	<0.01

Table A.2 Aggregate Wealth including Equity Investment Returns

Panel A Distribution

ΔWealth_Incl is the percentage change in aggregate wealth, which is household total net worth (Fed: Z1/Z1/FL152090005), including corporate equities (Z1/Z1/FL153064105) and indirectly held corporate equities (Z1/Z1/FL153064175). To adjust for high serial correlation, we use the first difference of the annual change in wealth. Annual series is from 1964 to 2018 (N=55).

	Mean	25th	50th	75th	Std Dev
ΔWealth_Incl	-0.001	-0.033	-0.001	0.030	0.056

Panel B Serial correlation

	1st lag	2st lag	3rd lag	4th lag	5th lag
ΔWealth_Incl	-0.17	-0.36	0.05	0.08	-0.28

Panel C Cross correlation

$\Delta Earnings_{MKT,t}$ is the sum of earnings in year t from all sample firms minus the sum of earnings from year t-1 divided by the sum of market capitalization at the end of year t-2. Our sample includes US common stocks (CRSP share code: 10 or 11). Earnings are operating income after depreciation (Compustat: OIADP) minus preferred stock dividends (PDVC). If OIADP is missing, we use IB (income before extraordinary items) instead. Change in total factor productivity $\Delta lnTFP$ is $\Delta lnY - \alpha\Delta lnK - (1-\alpha)\Delta lnL$ as estimated by Fernald (2012). ΔWealth is the percentage change in aggregate wealth, which is household total net worth (Fed: Z1/Z1/FL152090005) minus corporate equities (Z1/Z1/FL153064105) and indirectly held corporate equities (Z1/Z1/FL153064175). To adjust for high serial correlation, we use the first difference of the annual change in wealth. Annual series is from 1964 to 2018 (N=55). The upper-right panel of the correlation matrix presents Pearson correlations, and the lower-left panel presents Spearman correlations.

	$\Delta Earnings_{MKT}$	ΔTFP	ΔWealth	ΔWealth_Incl
$\Delta Earnings_{MKT}$				0.10
ΔTFP				0.03
ΔWealth				0.52
ΔWealth_Incl	0.06	0.04	0.53	

Panel D Contemporaneous aggregate time-series regressions

The t-statistics and p-values are based on heteroscedasticity-consistent standard errors.

$\Delta Earnings_{MKT}$ (t) = $\alpha_{A0} + \alpha_{A1}$ ΔTFP/Wealth_Incl (t) + ε (t)

Intercept	t	ΔTFP	t	ΔWealth_Incl	t	Adj. R^2
0.03	9.43			0.04	0.55	-0.01
0.02	6.56	0.55	2.91	0.03	0.62	0.17

Panel E The relation between contemporaneous and future aggregate earnings

The t-statistics and p-values are based on heteroscedasticity-consistent standard errors.

$\Delta Earnings_{MKT}$ (t+k) = $\alpha_{B0} + \alpha_{B1}$ ΔWealth_Incl (t) + ε (t+k)

k =	ΔWealth_Incl	t	Adj. R^2
0	0.04	0.55	-0.01
1	0.21	5.89	0.33
2	0.00	0.03	-0.02
3	-0.10	-2.02	0.06
4	0.01	0.19	-0.02
5	-0.05	-0.98	0.00

Panel F The relation between contemporaneous and future real GDP growth

ΔGDP is the real GDP growth, adjusted based on an AR(1) process. The t-statistics and p-values are based on heteroscedasticity-consistent standard errors.

ΔGDP (t+k) = $\alpha_{B0} + \alpha_{B1}$ ΔWealth_Incl (t) + ε (t+k)

k =	ΔWealth_Incl	t	Adj. R^2
0	-0.06	-0.95	0.01
1	0.18	3.19	0.23
2	0.05	1.13	0.00
3	-0.03	-0.68	-0.01
4	-0.05	-1.37	0.00
5	0.00	0.03	-0.02

Panel G Book-to-market portfolio time-series regressions

Sample firms are sorted into five portfolios based on their lagged B/M ratios from the previous year. B/M is book equity at the fiscal period end divided by market equity. Change in portfolio earnings is the sum of earnings in year t from all firms in a portfolio minus the sum of earnings from year t-1 divided by the sum of market capitalization at the end of year t-2. The t-statistics and p-values are based on heteroscedasticity-consistent standard errors.

$\Delta Earnings_p (t) = \beta_{0p} + \beta_{1p} \Delta Wealth\_Incl(t) + \varepsilon_p (t)$

	Intercept	t			ΔWealth_Incl	t	Adj. R^2
High B/M	0.023	4.04			-0.033	-0.33	-0.02
4	0.010	3.72			0.012	0.18	-0.02
3	0.011	5.76			-0.034	-0.80	0.00
2	0.010	7.32			-0.028	-1.04	0.00
Low B/M	0.012	10.24			-0.015	-0.74	-0.01

$\Delta Earnings_p (t) = \beta_{2p} + \beta_{3p} \Delta TFP (t) + \beta_{4p} \Delta Wealth\_Incl(t) + \varepsilon_p (t)$

	Intercept	t	ΔTFP	t	ΔWealth_Incl	t	Adj. R^2
High B/M	0.011	1.88	1.356	3.55	-0.046	-0.53	0.23
4	0.005	1.39	0.601	2.78	0.007	0.14	0.19
3	0.008	3.31	0.407	2.89	-0.038	-1.27	0.18
2	0.008	4.11	0.225	1.94	-0.030	-1.53	0.10
Low B/M	0.011	7.97	0.079	0.89	-0.015	-0.87	-0.01

Panel H Momentum portfolio time-series regressions

Sample firms are sorted into five portfolios based on cumulated continuously compounded stock returns from j-1 to j-12, where j is the portfolio formation month. Change in portfolio earnings is the sum of earnings in year t from all firms in a portfolio minus the sum of earnings from year t-1 divided by the sum of market capitalization at the end of year t-2. The t-statistics and p-values are based on heteroscedasticity-consistent standard errors.

$\Delta Earnings_p (t) = \beta_{0p} + \beta_{1p} \Delta Wealth\_Incl(t) + \varepsilon_p (t)$

	Intercept	t	ΔTFP	t	ΔWealth_Incl	t	Adj. R^2
High momentum	0.047	8.73			-0.039	-0.44	-0.02
4	0.026	8.23			-0.009	-0.20	-0.02
3	0.016	7.72			0.003	0.07	-0.02
2	0.011	5.52			0.005	0.11	-0.02
Low momentum	0.006	2.23			0.084	1.39	0.03

$\Delta Earnings_p (t) = \beta_{2p} + \beta_{3p} \Delta TFP (t) + \beta_{4p} \Delta Wealth\_Incl(t) + \varepsilon_p (t)$

	Intercept	t	ΔTFP	t	ΔWealth_Incl	t	Adj. R^2
High momentum	0.039	8.35	0.886	2.84	-0.048	-0.65	0.09
4	0.021	7.52	0.539	2.56	-0.014	-0.40	0.10
3	0.013	6.13	0.405	3.01	-0.001	-0.03	0.14
2	0.007	3.20	0.447	3.94	0.001	0.03	0.19
Low momentum	0.002	0.74	0.434	3.66	0.080	1.65	0.12

Panel I Firm size portfolio time-series regressions

Sample firms are sorted into five portfolios based on their lagged market capitalization in the end of year t-1. Change in portfolio earnings is the sum of earnings in year t from all firms in a portfolio minus the sum of earnings from year t-1 divided by the sum of market capitalization at the end of year t-2. The t-statistics and p-values are based on heteroscedasticity-consistent standard errors.

$\Delta Earnings_p (t) = \beta_{0p} + \beta_{1p} \Delta Wealth\_Incl (t) + \varepsilon_p (t)$

	Intercept	t	ΔTFP	t	ΔWealth_Incl	t	Adj. R^2
Large size	0.010	6.66			0.000	-0.01	-0.02
4	0.020	6.30			-0.004	-0.07	-0.02
3	0.025	7.17			0.005	0.07	-0.02
2	0.032	6.13			0.067	0.86	-0.01
Small size	0.046	7.12			0.101	1.06	-0.01

$\Delta Earnings_p (t) = \beta_{2p} + \beta_{3p} \Delta TFP (t) + \beta_{4p} \Delta Wealth\_Incl (t) + \varepsilon_p (t)$

	Intercept	t	ΔTFP	t	ΔWealth_Incl	t	Adj. R^2
Large size	0.007	4.01	0.294	2.63	-0.003	-0.15	0.15
4	0.014	3.62	0.694	3.07	-0.011	-0.25	0.19
3	0.018	4.75	0.787	3.59	-0.003	-0.07	0.20
2	0.021	4.26	1.115	3.44	0.057	0.98	0.19
Small size	0.034	5.15	1.258	2.96	0.089	1.43	0.16

Panel J Asset growth portfolio time-series regressions

Sample firms are sorted into five portfolios based on their lagged asset growth in year t-1. Asset growth is the change in the natural log of the book value of assets per split-adjusted share. Change in portfolio earnings is the sum of earnings in year t from all firms in a portfolio minus the sum of earnings from year t-1 divided by the sum of market capitalization at the end of year t-2. The t-statistics and p-values are based on heteroscedasticity-consistent standard errors.

$\Delta Earnings_p (t) = \beta_{0p} + \beta_{1p} \Delta Wealth\_Incl (t) + \varepsilon_p (t)$

	Intercept	t	ΔTFP	t	ΔWealth_Incl	t	Adj. R^2
High growth	0.014	7.01			-0.018	-0.48	-0.01
4	0.007	5.34			0.006	0.21	-0.02
3	0.006	4.78			0.001	0.02	-0.02
2	0.011	4.75			0.009	0.24	-0.02
Low growth	0.026	6.20			0.056	1.07	-0.01

$\Delta Earnings_p (t) = \beta_{2p} + \beta_{3p} \Delta TFP (t) + \beta_{4p} \Delta Wealth\_Incl (t) + \varepsilon_p (t)$

	Intercept	t	ΔTFP	t	ΔWealth_Incl	t	Adj. R^2
High growth	0.012	4.43	0.227	1.65	-0.020	-0.65	0.03
4	0.005	2.64	0.228	2.32	0.003	0.17	0.12
3	0.004	2.15	0.322	3.18	-0.003	-0.14	0.22
2	0.006	2.35	0.475	2.36	0.005	0.20	0.17
Low growth	0.019	4.99	0.810	2.66	0.049	1.17	0.15

Panel K Distribution of earnings wealth beta (N=81)

This table presents summary statistics of the estimated earnings wealth beta $\hat{\beta}_{Wealth\_Incl}$, based on wealth, including direct and indirect corporate equities. All sample firms are sorted into 81 portfolios based on lagged B/M, return momentum MMT, firm size, and asset growth ATG from the previous year (i.e., 3 B/M terciles, 3 return momentum terciles, 3 size tercile, and 3 asset growth terciles). We run two time-series regressions for each portfolio to estimate earnings wealth beta: 1) $\Delta Earnings_{t,p} = \gamma_{op} + \beta_{MKT,p}\Delta Earnings_{MKT,t} + \varepsilon_{\gamma,t,p}$ and $\Delta Earnings_{t,p} = \delta_{op} + \beta_{TFP,p}\Delta TFP_t + \beta_{Wealth,p}\Delta Wealth\_Incl_t + \varepsilon_{\delta,t,p}$.

	Mean	25th	50th	75th	Std Dev
Wealth_Incl beta	-0.019	-0.048	-0.003	0.062	0.148

Panel L Cross correlation of earnings betas (N=81)

The upper-right panel of the correlation matrix presents Pearson correlations, and the lower-left panel presents Spearman correlations.

	Index beta	TFP beta	Wealth_Incl beta
Index beta			0.06
TFP beta			-0.10
Wealth_Incl beta	0.08	0.03	

Panel M Cross-sectional pricing test

In this table, we report the average monthly intercept and slope coefficient, along with Fama and MacBeth (1973) t-statistics and the average regression adjusted R^2. A firm's characteristics (B/M ratio, cumulative return, market capitalization, and asset growth) at the end of year t-1 determine its assignment to a portfolio and hence its beta estimates. Twelve subsequent monthly returns are regressed individually on these betas, starting in the seventh month after portfolio formation. In each month, we estimate the following cross-sectional regression: $RET_{m,i} = \vartheta_{0m} + \vartheta_{1m}\hat{\beta}_{TFP,t,i} + \vartheta_{2m}\hat{\beta}_{Wealth,t,i} + \varepsilon_{\vartheta,m,i}$. The t-statistics are based on heteroscedasticity-consistent standard errors.

Intercept	t	TFP Beta	t	Wealth Beta	t	Adj. R^2
0.90%	4.18	0.43%	5.83	0.59%	2.70	0.69%

Table A.3 Aggregate "Index" Earnings versus Changes in TFP and Wealth

This table presents correlations among macroeconomic indicators, aggregate earnings, change in total factor productivity, and change in aggregate wealth. Following Chen, Roll, and Ross (1986), we select eight macro indicators: 30-day T-bill rate, Term spread (30-year T-bond rate minus 30-day T-bill rate), Default spread (Baa corporate bond yield minus 30-year T-bond rate), real GDP growth, change in the unemployment rate (Urate), change in consumption per capita (Spend), change in housing starts (Hstart), and change in the oil price per barrel (Oil). Data comes from CRSP, Federal Reserve Bank of St. Louis, and US Energy Information Administration. Annual series is from 1964 to 2018 (N=55). A principal component analysis reduces the eight macro indicators to four orthogonalized components in which eigenvalues are above one. Panel A presents the adjusted R^2 from regressing a principal component on aggregate earnings or on changes in TFP and wealth. Panel B presents the adjusted R^2 from regressing a macro indicator on aggregate earnings or on changes in TFP and wealth. We bootstrap one hundred times to compute the p-value for the difference in the adjusted R^2. $\Delta Earnings_{MKT,t}$ is the sum of earnings in year t from all sample firms minus the sum of earnings from year t-1 divided by the sum of market capitalization at the end of year t-2. Our sample includes US common stocks (CRSP share code: 10 or 11). Earnings are operating income after depreciation (Compustat: OIADP) minus preferred stock dividends (PDVC). If OIADP is missing, we use IB (income before extraordinary items) instead. Change in total factor productivity $\Delta lnTFP$ is $\Delta lnY - \alpha\Delta lnK - (1-\alpha)\Delta lnL$ is estimated by Fernald (2012). Change in wealth $\Delta Wealth$ is the percentage change in aggregate wealth. Aggregate wealth is household total net worth (Fed: Z1/Z1/FL152090005) minus corporate equities (Z1/Z1/FL153064105) and indirectly held corporate equities (Z1/Z1/FL153064175). To adjust for high serial correlations, we use the first difference of the change in annual wealth. Firm-level earnings are winsorized at +/- 1%.

Panel A

Model (1): N^{th} Principal Component (t) = $\eta_0 + \eta_1\ \Delta Earnings_{MKT}$ (t) + ε (t)

Model (2): N^{th} Principal Component (t) = $\eta_2 + \eta_3\ \Delta TFP$ (t) + $\eta_4\ \Delta Wealth$ (t) + ε (t)

Principal Component	First	Second	Third	Fourth
Model (1) Adj. R^2	0.001	0.055	0.014	0.024
Model (2) Adj. R^2	0.083	0.123	0.101	0.209
P-value for the diff.	<0.01	<0.01	<0.01	<0.01

Panel B

Model (3): Macro Indicator (t) = $\eta_5 + \eta_6\ \Delta Earnings_{MKT}$ (t) + ε (t)

Model (4): Macro Indicator (t) = $\eta_7 + \eta_8\ \Delta TFP$ (t) + $\eta_9\ \Delta Wealth$ (t) + ε (t)

Macro Indicator	T-Bill	Term	Default	GDP	Urate	Spend	Hstart	Oil
Model (1) Adj. R^2	0.007	0.013	0.010	0.240	0.027	0.027	0.076	0.053
Model (2) Adj. R^2	0.058	0.026	0.017	0.640	0.089	0.492	0.270	0.047
P-value for the diff.	<0.01	0.05	0.23	<0.01	<0.01	<0.01	<0.01	0.59

Table A.4 Earnings Betas Estimated by Industry Portfolios

Panel A Distribution of earnings betas (N=76)

Firms are sorted into 76 industry portfolios based on the MSCI's Global Industry Classification Standard six-digit industries. We run two time-series regressions for each portfolio to estimate three earnings betas: 1) $\Delta Earnings_{t,p} = \gamma_{op} + \beta_{MKT,p}\Delta Earnings_{MKT,t} + \varepsilon_{\gamma,t,p}$ and $\Delta Earnings_{t,p} = \delta_{op} + \beta_{TFP,p}\Delta TFP_t + \beta_{Wealth,p}\Delta Wealth_t + \varepsilon_{\delta,t,p}$. This table presents summary statistics of three estimated earnings betas.

	Mean	25th	50th	75th	Std Dev
Index beta	1.28	0.57	1.16	1.74	1.02
TFP beta	0.38	0.05	0.32	0.60	0.79
Wealth beta	0.15	-0.01	0.08	0.20	0.33

Panel B Cross correlation of earnings betas (N=76)

The upper-right panel of the correlation matrix presents Pearson correlations, and the lower-left panel presents Spearman correlations.

	Index beta	TFP beta	Wealth beta
Index beta		-0.11	0.42
TFP beta	0.20		-0.35
Wealth beta	0.34	-0.04	

Panel C Distribution of earnings betas (N=186)

Firms are sorted into 186 industry portfolios based on the MSCI's Global Industry Classification Standard eight-digit industries. We run two time-series regressions for each portfolio to estimate three earnings betas: 1) $\Delta Earnings_{t,p} = \gamma_{op} + \beta_{MKT,p}\Delta Earnings_{MKT,t} + \varepsilon_{\gamma,t,p}$ and $\Delta Earnings_{t,p} = \delta_{op} + \beta_{TFP,p}\Delta TFP_t + \beta_{Wealth,p}\Delta Wealth_t + \varepsilon_{\delta,t,p}$. This table presents summary statistics of three estimated earnings betas.

	Mean	25th	50th	75th	Std Dev
Index beta	1.22	0.61	1.32	2.20	3.69
TFP beta	0.65	0.03	0.37	0.88	3.05
Wealth beta	0.02	-0.05	0.08	0.29	2.18

Panel D Cross correlation of earnings betas (N=186)

The upper-right panel of the correlation matrix presents Pearson correlations, and the lower-left panel presents Spearman correlations.

	Index beta	TFP beta	Wealth beta
Index beta		-0.14	0.36
TFP beta	0.35		-0.85
Wealth beta	0.20	-0.31	

Table A.5 Out of Sample Pricing Test: Estimation period 1964-1990; Pricing test 1991-2018

Panel A Distribution of earnings betas (N=81)

We use annual series from 1964-1990 to estimate earnings betas. This table presents summary statistics of three estimated earnings betas: Index beta $\hat{\beta}_{MKT}$, TFP beta $\hat{\beta}_{TFP}$, and wealth beta $\hat{\beta}_{Wealth}$. All sample firms are sorted into 81 portfolios based on lagged B/M, return momentum MMT, firm size, and asset growth ATG from the previous year (i.e., 3 B/M terciles, 3 return momentum terciles, 3 size tercile, and 3 asset growth terciles). Then we run two time-series regressions for each portfolio: 1) $\Delta Earnings_{t,p} = \gamma_{op} + \beta_{MKT,p}\Delta Earnings_{MKT,t} + \varepsilon_{\gamma,t,p}$ and 2) $\Delta Earnings_{t,p} = \delta_{op} + \beta_{TFP,p}\Delta TFP_t + \beta_{Wealth,p}\Delta Wealth_t + \varepsilon_{\delta,t,p}$.

	Mean	25th	50th	75th	Std Dev
Index beta	2.00	1.05	1.70	2.69	1.62
TFP beta	0.43	-0.22	0.36	1.07	1.41
Wealth beta	0.18	-0.19	0.27	0.65	1.50

Panel B Cross correlation of earnings betas (N=81)

The upper-right panel of the correlation matrix presents Pearson correlations, and the lower-left panel presents Spearman correlations.

	Index beta	TFP beta	Wealth beta
Index beta		-0.28	0.43
TFP beta	0.23		-0.87
Wealth beta	0.01	-0.76	

Panel C Serial correlation of firm-year earnings betas

A firm's characteristics (B/M ratio, cumulative return, market capitalization, and asset growth) at the end of year t-1 determine its assignment to a portfolio and hence its beta estimates.

	1st lag	2st lag	3rd lag	4th lag	5th lag
Index beta	0.63	0.25	0.22	0.22	0.20
TFP beta	0.62	0.22	0.20	0.22	0.21
Wealth beta	0.52	0.05	0.03	0.07	0.06

Panel D Cross-sectional pricing test on earnings betas

The pricing test period is from 1991-2018. In this table, we report the average monthly intercept and slope coefficient, along with Fama and MacBeth (1973) t-statistics and the average regression adjusted R^2. Twelve subsequent monthly returns are regressed individually on these betas, starting in the seventh month after portfolio formation. In each month, we estimate the following cross-sectional regressions: Model (1) $RET_{m,i} = \tau_{0m} + \tau_{1m}\hat{\beta}_{MKT,t,i} + \varepsilon_{\tau,m,i}$ and Model (2) $RET_{m,i} = \vartheta_{0m} + \vartheta_{1m}\hat{\beta}_{TFP,t,i} + \vartheta_{2m}\hat{\beta}_{Wealth,t,i} + \varepsilon_{\vartheta,m,i}$. The t-statistics are based on heteroscedasticity-consistent standard errors.

Intercept	t	Index beta	t			Adj. R^2	P-value for diff in R^2
1.04%	3.83	0.11%	3.13			0.15%	<0.01
Intercept	t	TFP Beta	t	Wealth Beta	t	Adj. R^2	
1.12%	3.80	0.26%	3.15	0.14%	2.53	0.28%	

Table A.6 Out of Sample Pricing Test: Estimation period 1991-2018; Pricing test 1964-1990

Panel A Distribution of earnings betas (N=81)

We use annual series from 1991-2018 to estimate earnings betas. This table presents summary statistics of three estimated earnings betas: Index beta $\hat{\beta}_{MKT}$, TFP beta $\hat{\beta}_{TFP}$, and wealth beta $\hat{\beta}_{Wealth}$. All sample firms are sorted into 81 portfolios based on lagged B/M, return momentum MMT, firm size, and asset growth ATG from the previous year (i.e., 3 B/M terciles, 3 return momentum terciles, 3 size tercile, and 3 asset growth terciles). Then we run two time-series regressions for each portfolio: 1) $\Delta Earnings_{t,p} = \gamma_{op} + \beta_{MKT,p}\Delta Earnings_{MKT,t} + \varepsilon_{\gamma,t,p}$ and 2) $\Delta Earnings_{t,p} = \delta_{op} + \beta_{TFP,p}\Delta TFP_t + \beta_{Wealth,p}\Delta Wealth_t + \varepsilon_{\delta,t,p}$.

	Mean	25th	50th	75th	Std Dev
Index beta	1.78	0.86	1.52	2.50	1.48
TFP beta	0.90	0.39	0.65	1.23	1.10
Wealth beta	0.15	0.02	0.11	0.25	0.26

Panel B Cross correlation of earnings betas (N=81)

The upper-right panel of the correlation matrix presents Pearson correlations, and the lower-left panel presents Spearman correlations.

	Index beta	TFP beta	Wealth beta
Index beta		0.78	0.56
TFP beta	0.72		0.32
Wealth beta	0.48	0.17	

Panel C Serial correlation of firm-year earnings betas

A firm's characteristics (B/M ratio, cumulative return, market capitalization, and asset growth) at the end of year t-1 determine its assignment to a portfolio and hence its beta estimates.

	1st lag	2st lag	3rd lag	4th lag	5th lag
Index beta	0.66	0.32	0.28	0.29	0.25
TFP beta	0.58	0.16	0.13	0.17	0.13
Wealth beta	0.60	0.20	0.17	0.19	0.16

Panel D Cross-sectional pricing test on earnings betas

The pricing test period is from 1964-1990. In this table, we report the average monthly intercept and slope coefficient, along with Fama and MacBeth (1973) t-statistics and the average regression adjusted R^2. Twelve subsequent monthly returns are regressed individually on these betas, starting in the seventh month after portfolio formation. In each month, we estimate the following cross-sectional regressions: Model (1) $RET_{m,i} = \tau_{0m} + \tau_{1m}\hat{\beta}_{MKT,t,i} + \varepsilon_{\tau,m,i}$ and Model (2) $RET_{m,i} = \vartheta_{0m} + \vartheta_{1m}\hat{\beta}_{TFP,t,i} + \vartheta_{2m}\hat{\beta}_{Wealth,t,i} + \varepsilon_{\vartheta,m,i}$. The t-statistics are based on heteroscedasticity-consistent standard errors.

Intercept	t	Index beta	t			Adj. R^2	P-value for diff in R^2
0.91%	2.83	0.16%	5.25			0.30%	<0.01
Intercept	t	TFP Beta	t	Wealth Beta	t	Adj. R^2	
1.02%	3.17	0.08%	3.11	0.62%	4.18	0.34%	

Table A.7 Add 76 Industry Portfolios

Panel A Distribution of earnings betas (N=157)

All sample firms are sorted twice into 1) 81 portfolios based on lagged B/M, return momentum MMT, firm size, and asset growth ATG from the previous year (i.e., 3 B/M terciles, 3 return momentum terciles, 3 size tercile, and 3 asset growth terciles), and 2) 76 industry portfolios based on the MSCI's Global Industry Classification Standard six-digit industries. Then we run two time-series regressions for each portfolio: 1) $\Delta Earnings_{t,p} = \gamma_{op} + \beta_{MKT,p}\Delta Earnings_{MKT,t} + \varepsilon_{\gamma,t,p}$ and 2) $\Delta Earnings_{t,p} = \delta_{op} + \beta_{TFP,p}\Delta TFP_t + \beta_{Wealth,p}\Delta Wealth_t + \varepsilon_{\delta,t,p}$. This table presents summary statistics of three estimated earnings betas: Index beta $\hat{\beta}_{MKT}$, TFP beta $\hat{\beta}_{TFP}$, and wealth beta $\hat{\beta}_{Wealth}$.

	Mean	25th	50th	75th	Std Dev
Index beta	1.61	0.81	1.36	2.14	1.17
TFP beta	0.49	0.08	0.42	0.78	0.72
Wealth beta	0.16	0.01	0.10	0.23	0.30

Panel B Cross correlation of earnings betas (N=157)

The upper-right panel of the correlation matrix presents Pearson correlations, and the lower-left panel presents Spearman correlations.

	Index beta	TFP beta	Wealth beta
Index beta		0.01	0.40
TFP beta	0.34		-0.38
Wealth beta	0.38	-0.10	

Panel C Cross-sectional pricing test on earnings betas

In this table, we report the average monthly intercept and slope coefficient, along with Fama and MacBeth (1973) t-statistics and the average regression adjusted R^2. A firm's characteristics (B/M ratio, cumulative return, market capitalization, and asset growth) at the end of year t-1 and its industry membership determine its assignment to portfolios and hence its beta estimates. Twelve subsequent monthly returns are regressed individually on these betas, starting in the seventh month after portfolio formation. In each month, we estimate the following cross-sectional regressions: Model (1) $RET_{m,i} = \tau_{0m} + \tau_{1m}\hat{\beta}_{MKT,t,i} + \varepsilon_{\tau,m,i}$ and Model (2) $RET_{m,i} = \vartheta_{0m} + \vartheta_{1m}\hat{\beta}_{TFP,t,i} + \vartheta_{2m}\hat{\beta}_{Wealth,t,i} + \varepsilon_{\vartheta,m,i}$. The t-statistics are based on heteroscedasticity-consistent standard errors.

Intercept	t	Index beta	t			Adj. R^2	P-value for diff in R^2
1.02%	5.01	0.12%	4.41			0.22%	<0.01
Intercept	t	TFP Beta	t	Wealth Beta	t	Adj. R^2	
1.01%	4.93	0.26%	4.56	0.46%	5.45	0.40%	

Table A.8 Add 186 Industry Portfolios

Panel A Distribution of earnings betas (N=267)

All sample firms are sorted twice into 1) 81 portfolios based on lagged B/M, return momentum MMT, firm size, and asset growth ATG from the previous year (i.e., 3 B/M terciles, 3 return momentum terciles, 3 size tercile, and 3 asset growth terciles), and 2) 186 industry portfolios based on the MSCI's Global Industry Classification Standard eight-digit industries. Then we run two time-series regressions for each portfolio: 1) $\Delta Earnings_{t,p} = \gamma_{op} + \beta_{MKT,p}\Delta Earnings_{MKT,t} + \varepsilon_{\gamma,t,p}$ and 2) $\Delta Earnings_{t,p} = \delta_{op} + \beta_{TFP,p}\Delta TFP_t + \beta_{Wealth,p}\Delta Wealth_t + \varepsilon_{\delta,t,p}$. This table presents summary statistics of three estimated earnings betas: Index beta $\hat{\beta}_{MKT}$, TFP beta $\hat{\beta}_{TFP}$, and wealth beta $\hat{\beta}_{Wealth}$.

	Mean	25th	50th	75th	Std Dev
Index beta	1.43	0.75	1.46	2.40	3.16
TFP beta	0.63	0.08	0.43	0.90	2.56
Wealth beta	0.06	-0.03	0.10	0.28	1.82

Panel B Cross correlation of earnings betas (N=267)

The upper-right panel of the correlation matrix presents Pearson correlations, and the lower-left panel presents Spearman correlations.

	Index beta	TFP beta	Wealth beta
Index beta		-0.14	0.36
TFP beta	0.38		-0.85
Wealth beta	0.26	-0.28	

Panel C Cross-sectional pricing test on earnings betas

In this table, we report the average monthly intercept and slope coefficient, along with Fama and MacBeth (1973) t-statistics and the average regression adjusted R^2. A firm's characteristics (B/M ratio, cumulative return, market capitalization, and asset growth) at the end of year t-1 and its industry membership determine its assignment to portfolios and hence its beta estimates. Twelve subsequent monthly returns are regressed individually on these betas, starting in the seventh month after portfolio formation. In each month, we estimate the following cross-sectional regressions: Model (1) $RET_{m,i} = \tau_{0m} + \tau_{1m}\hat{\beta}_{MKT,t,i} + \varepsilon_{\tau,m,i}$ and Model (2) $RET_{m,i} = \vartheta_{0m} + \vartheta_{1m}\hat{\beta}_{TFP,t,i} + \vartheta_{2m}\hat{\beta}_{Wealth,t,i} + \varepsilon_{\vartheta,m,i}$. The t-statistics are based on heteroscedasticity-consistent standard errors.

Intercept	t	Index beta	t			Adj. R^2	P-value for diff in R^2
1.06%	5.28	0.09%	3.72			0.23%	<0.01
Intercept	t	TFP Beta	t	Wealth Beta	t	Adj. R^2	
1.07%	5.14	0.19%	4.26	0.28%	4.53	0.34%	

Table A.9 Quarterly Analysis: 1976Q1-2017Q4

Panel A Distribution of earnings betas (N=81)

Quarterly series are from 1976Q1 to 2017Q4. It starts in 1976 due to the mandatory adoption of quarterly financial reporting. It ends in 2017 because of the quarterly TFP series estimated by Fernald (2012). This table presents summary statistics of three estimated earnings betas: Index beta $\hat{\beta}_{MKT}$, TFP beta $\hat{\beta}_{TFP}$, and wealth beta $\hat{\beta}_{Wealth}$. All sample firms are sorted into 81 portfolios based on the same quarter of the previous year's B/M, firm size, and asset growth, and the q-2 quarter's return momentum MMT where q is the portfolio formation quarter. Then we run two quarterly time-series regressions for each portfolio: 1) $\Delta Earnings_{q,p} = \gamma_{op} + \beta_{MKT,p}\Delta Earnings_{MKT,q} + \varepsilon_{\gamma,q,p}$ and 2) $\Delta Earnings_{q,p} = \delta_{op} + \beta_{TFP,p}\Delta TFP_q + \beta_{Wealth,p}\Delta Wealth_q + \varepsilon_{\delta,q,p}$. $\Delta Earnings_{MKT,q}$ is change in aggregate earnings measured as the sum of earnings in quarter q from all sample firms minus the sum of earnings from quarter q-4 divided by the sum of market capitalization at the end of year t-2. Our sample includes US common stocks (CRSP share code: 10 or 11) and restricts to firms whose fiscal quarters end in March, June, September, or December. Earnings are operating income after depreciation (Compustat: OIADP) minus preferred stock dividends (PDVC). If OIADP is missing, we use IB (income before extraordinary items) instead. Change in total factor productivity $\Delta lnTFP$ is $\Delta lnY - \alpha\Delta lnK - (1-\alpha)\Delta lnL$ is estimated by Fernald (2012). Seasonally adjusted change in wealth $\Delta Wealth$ is based on household total net worth (FRED: TNWBSHNO) minus corporate equities (FRED: HNOCEA) and indirectly held corporate equities (FRED: HNOMFSA). To adjust for high serial correlations, we use the first difference of the change in quarterly wealth. Firm-level earnings are winsorized at +/- 1%.

	Mean	25th	50th	75th	Std Dev
Index beta	1.87	0.85	1.42	2.48	1.64
TFP beta	0.06	0.00	0.03	0.10	0.10
Wealth beta	0.15	0.07	0.15	0.27	0.28

Panel B Cross correlation of earnings betas (N=81)

The upper-right panel of the correlation matrix presents Pearson correlations, and the lower-left panel presents Spearman correlations.

	Index beta	TFP beta	Wealth beta
Index beta		0.19	-0.45
TFP beta	0.09		-0.36
Wealth beta	0.04	-0.05	

Table A.9 Quarterly Analysis: 1976Q1-2017Q4 (Continued)

Panel C Serial correlation of firm-quarter earnings betas

A firm's characteristics (B/M ratio, market capitalization, and asset growth) from the same quarter of the previous year or the q-2 quarter's return momentum MMT determine its assignment to a portfolio in quarter q and hence its beta estimates.

	1st lag	2st lag	3rd lag	4th lag	5th lag
Index beta	0.34	0.29	0.26	0.22	0.22
TFP beta	0.54	0.47	0.43	0.39	0.36
Wealth beta	0.33	0.27	0.24	0.21	0.19

Panel D Cross-sectional pricing test on earnings betas

In this table, we report the average quarterly intercept and slope coefficient, along with Fama and MacBeth (1973) t-statistics and the average regression adjusted R^2. A firm's characteristics (B/M ratio, market capitalization, and asset growth) from the same quarter of the previous year or the q-2 quarter's return momentum MMT determine its assignment to a portfolio in quarter q and hence its beta estimates. The q+2 quarterly returns are regressed individually on these betas. In each quarter, we estimate the following cross-sectional regressions: Model (1) $RET_{q,i} = \tau_{0q} + \tau_{1q}\hat{\beta}_{MKT,q,i} + \varepsilon_{\tau,q,i}$ and Model (2) $RET_{q,i} = \vartheta_{0q} + \vartheta_{1q}\hat{\beta}_{TFP,q,i} + \vartheta_{2q}\hat{\beta}_{Wealth,q,i} + \varepsilon_{\vartheta,q,i}$. The t-statistics are based on heteroscedasticity-consistent standard errors.

Intercept	t	Index beta	t			Adj. R^2	P-value for diff in R^2
3.93%	5.14	0.19%	2.96			0.18%	<0.01
Intercept	t	TFP Beta	t	Wealth Beta	t	Adj. R^2	
3.67%	4.65	6.85%	4.64	0.98%	2.54	0.63%	

Table A.10 Portfolio Analysis

We use an annual series of aggregate earnings and changes in total factor productivity and aggregate wealth from 1964-2018 to estimate three earnings betas: Index beta $\hat{\beta}_{MKT}$, TFP beta $\hat{\beta}_{TFP}$, and wealth beta $\hat{\beta}_{Wealth}$. All sample firms are sorted into 81 portfolios based on lagged B/M, return momentum MMT, firm size, and asset growth ATG from the previous year (i.e., 3 B/M terciles, 3 return momentum terciles, 3 size tercile, and 3 asset growth terciles). Then we run two time-series regressions for each portfolio: 1) $\Delta Earnings_{t,p} = \gamma_{op} + \beta_{MKT,p}\Delta Earnings_{MKT,t} + \varepsilon_{\gamma,t,p}$ and 2) $\Delta Earnings_{t,p} = \delta_{op} + \beta_{TFP,p}\Delta TFP_t + \beta_{Wealth,p}\Delta Wealth_t + \varepsilon_{\delta,t,p}$. A firm's characteristics (B/M ratio, cumulative return, market capitalization, and asset growth) at the end of year t-1 determine its assignment to a portfolio and hence its beta estimates. Twelve subsequent monthly returns are merged with these betas, starting in the seventh month after portfolio formation. Then we calculate the equal-weighted or value-weighted (based on beginning market capitalization) portfolio monthly or annual returns. In each month or year, we estimate the following cross-sectional regressions: Model (1) $RET_{m/t,p} = \tau_{0m/t} + \tau_{1m/t}\hat{\beta}_{MKT,t,p} + \varepsilon_{\tau,m/t,p}$ and Model (2) $RET_{m/t,p} = \vartheta_{0m/t} + \vartheta_{1m/t}\hat{\beta}_{TFP,t,p} + \vartheta_{2m/t}\hat{\beta}_{Wealth,t,p} + \varepsilon_{\vartheta,m/t,p}$. In the following tables, we report the average monthly or annual intercept and slope coefficient, along with Fama and MacBeth (1973) t-statistics and the average regression adjusted R^2. The t-statistics are based on heteroscedasticity-consistent standard errors.

Panel A Value-weighted Monthly Return

Intercept	t	Index beta	t			Adj. R^2	P-value for diff in R^2
0.97%	16.57	0.08%	3.24			0.02%	<0.01
Intercept	t	TFP Beta	t	Wealth Beta	t	Adj. R^2	
0.92%	16.89	0.20%	3.81	0.55%	4.34	0.04%	

Panel B Value-weighted Annual Return

Intercept	t	Index beta	t			Adj. R^2	P-value for diff in R^2
12.41%	15.46	1.46%	2.33			0.06%	<0.01
Intercept	t	TFP Beta	t	Wealth Beta	t	Adj. R^2	
10.68%	10.55	3.99%	3.38	13.27%	2.08	0.25%	

Panel C Equal-weighted Monthly Return

Intercept	t	Index beta	t			Adj. R^2	P-value for diff in R^2
1.01%	17.21	0.10%	3.77			0.03%	<0.01
Intercept	t	TFP Beta	t	Wealth Beta	t	Adj. R^2	
0.00%	16.95	0.26%	4.91	0.69%	5.49	0.07%	

Panel D Equal-weighted Annual Return

Intercept	t	Index beta	t			Adj. R^2	P-value for diff in R^2
12.86%	15.44	1.71%	2.20			0.04%	<0.01
Intercept	t	TFP Beta	t	Wealth Beta	t	Adj. R^2	
10.60%	8.96	4.77%	3.34	16.57%	2.00	0.24%	

Figure 1 Fitted and Realized Returns for 81 Portfolios

The figure presents the average realized and fitted monthly returns for 81 portfolios based on lagged B/M, return momentum MMT, firm size, and asset growth ATG from the previous year (i.e., 3 B/M terciles, 3 return momentum terciles, 3 size tercile, and 3 asset growth terciles). A firm's characteristics (B/M ratio, cumulative return, market capitalization, and asset growth) at the end of year t-1 determine its assignment to a portfolio and hence its beta estimates. Twelve subsequent monthly returns are merged with these betas, starting in the seventh month after portfolio formation. Fitted return is calculated based on a firm's TFP and wealth earnings betas and the average monthly intercept and slope coefficient reported in Table 8 of the manuscript. The figure plots the average of realized and fitted monthly returns across firms for 81 portfolios. The slope is positive and significant (p-value< 0.01). The adjusted R^2 is 0.287.