Being Surprised by the Unsurprising: Earnings Seasonality and Stock Returns

Chang et al(2017)

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1. Background

- The shares of American companies which manufacture ice tend to sell at a higher price in summer when their profits are seasonally high than in winter when no one wants ice

—John Maynard Keynes (1936)

1. Background

- There is a growing body of evidence that many similarly obvious repeating firm events are associated with puzzling abnormal returns.

- Abnormal returns are evident in months forecasted to have earnings announcements, dividends, stock splits, stock dividends, special dividends, and increases in dividends.

- Earnings seasonality is thus an interesting test of the proposition that **recurring firm events are generally associated with abnormal returns.**

1.Literatures

Strange phenomenon

- Keynes(1936)/Salamon and Stober(1994): firms have higher stock returns around earnings announcements covering periods of seasonally higher sales

1.Literatures

Why there exists "seasonality premium"?

- how markets underreact to earnings news: (Ball and Brown 1968; Bernard and Thomas 1989, 1990)

- form mistaken forecasts of earnings autocorrelation (Bernard and Thomas 1990; Ball and Bartov 1996)

- fail to fully price changes in earnings announcement dates (So and Weber 2015)

- miss predictable shifts in fiscal quarter lengths (Johnston et al. 2012)

1.Motivations

- Q1: Does **Earnings Seasonality** really exist?

    Yes!

- Q2: Why does it exist?

    Mispricing

1.Contributions

- Present evidence of abnormal returns consistent with markets failing to properly price information contained in the seasonal patterns of earnings.

- It contributes to the literature that examines underreaction and information-processing constraints.

- It also contributes to the literature on how market participants form estimates of firm earnings.

2.Data

- Stocks: common stock of firms listed on NYSE, AMEX, or NASDAQ

- Time: 1972.10~2013.09
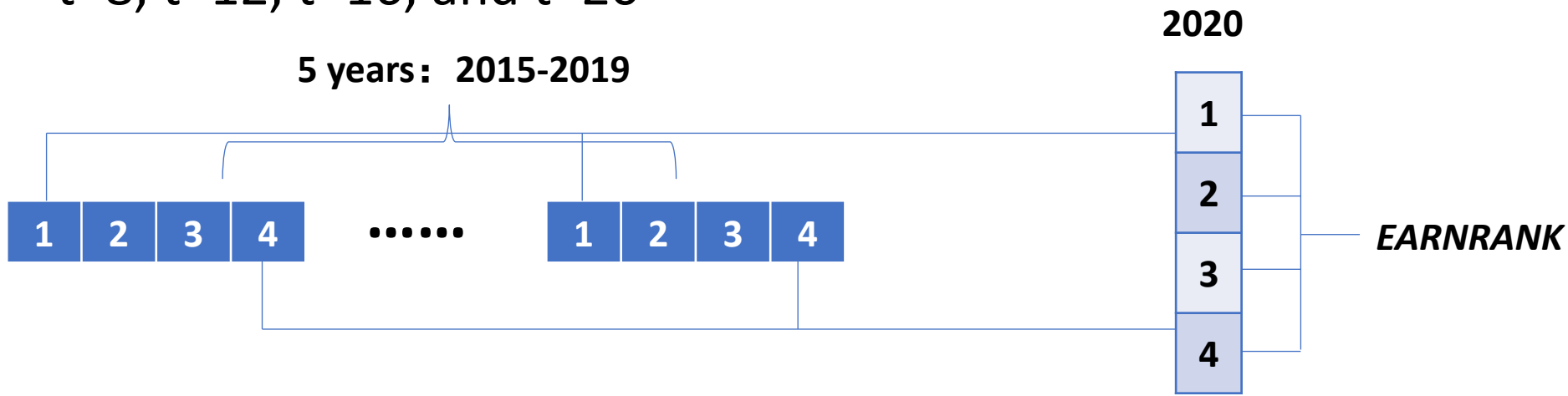
- Frequency: monthly & quaterly

3.Method

Constructing measures

- seasonality: measure the extent to which earnings in a given quarter tend to be higher than in other quarters

- the measure of predicted seasonality in quarter t: *earnrank*

- A high value of earnrank means that, historically, the current quarter of the year has larger earnings than other quarters
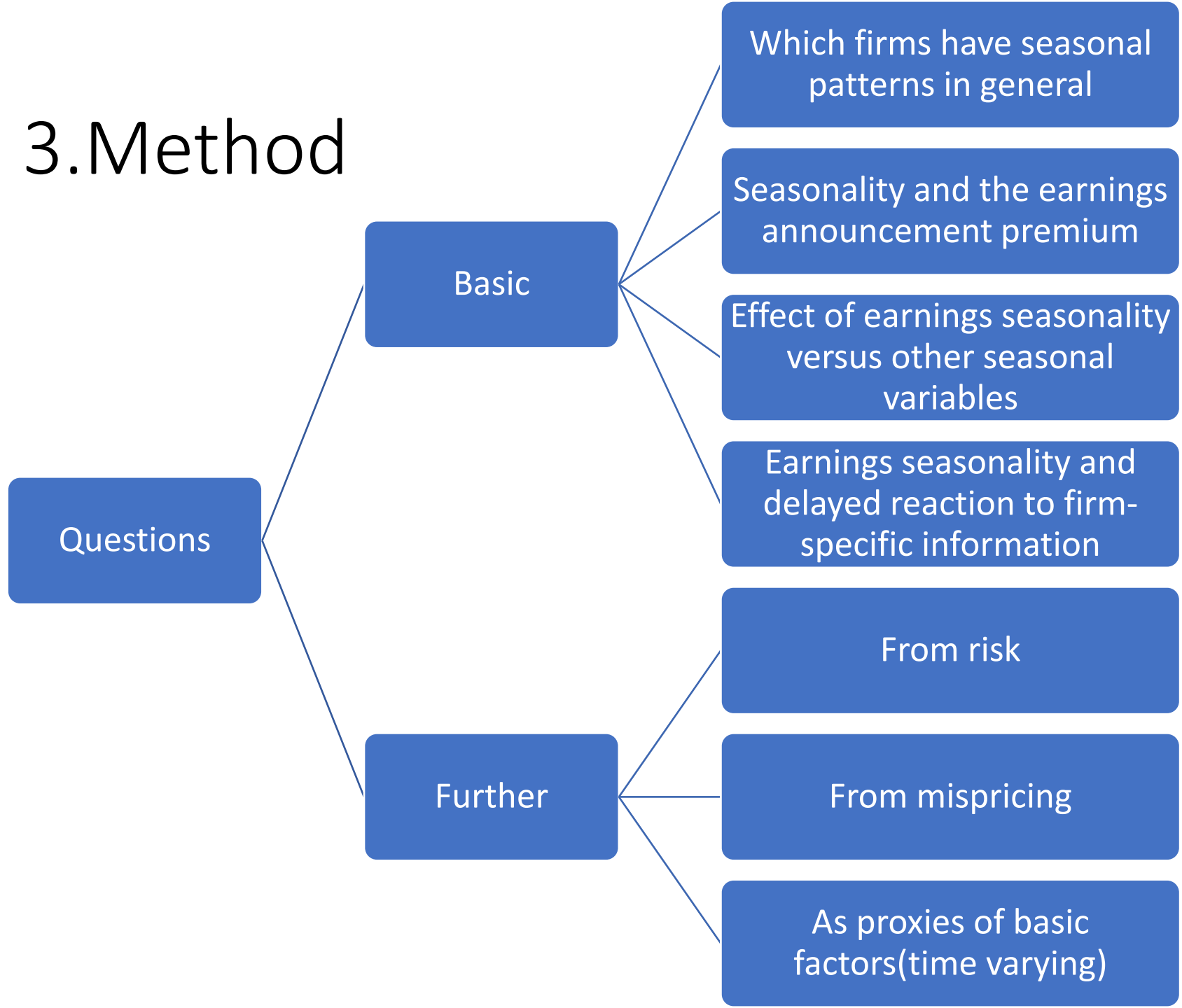
3.Method

Earnrank:

- ①use five years of earnings data from quarter t−23 to t−4

- ②calculate EPS(excluding extraordinary items) adjusted for stock splits

- ③rank the 20 quarters of earnings data from largest to smallest

- ④*earnrank*: for quarter t is the average rank of quarters t−4, t−8, t−12, t−16, and t−20

2020

5 years： 2015-2019

1	2	3	4

······

1	2	3	4

1
2
3
4

EARNRANK

3.Method

4.Results_Q1.1

Which firms have seasonal patterns in general

High seasonality

5 years

| 1 | 2 | 3 | 4 | ······ | 1 | 2 | 3 | 4 |

1	3	9
2	8	10
3	13	11
4	18	12

Low seasonality

Difference=y
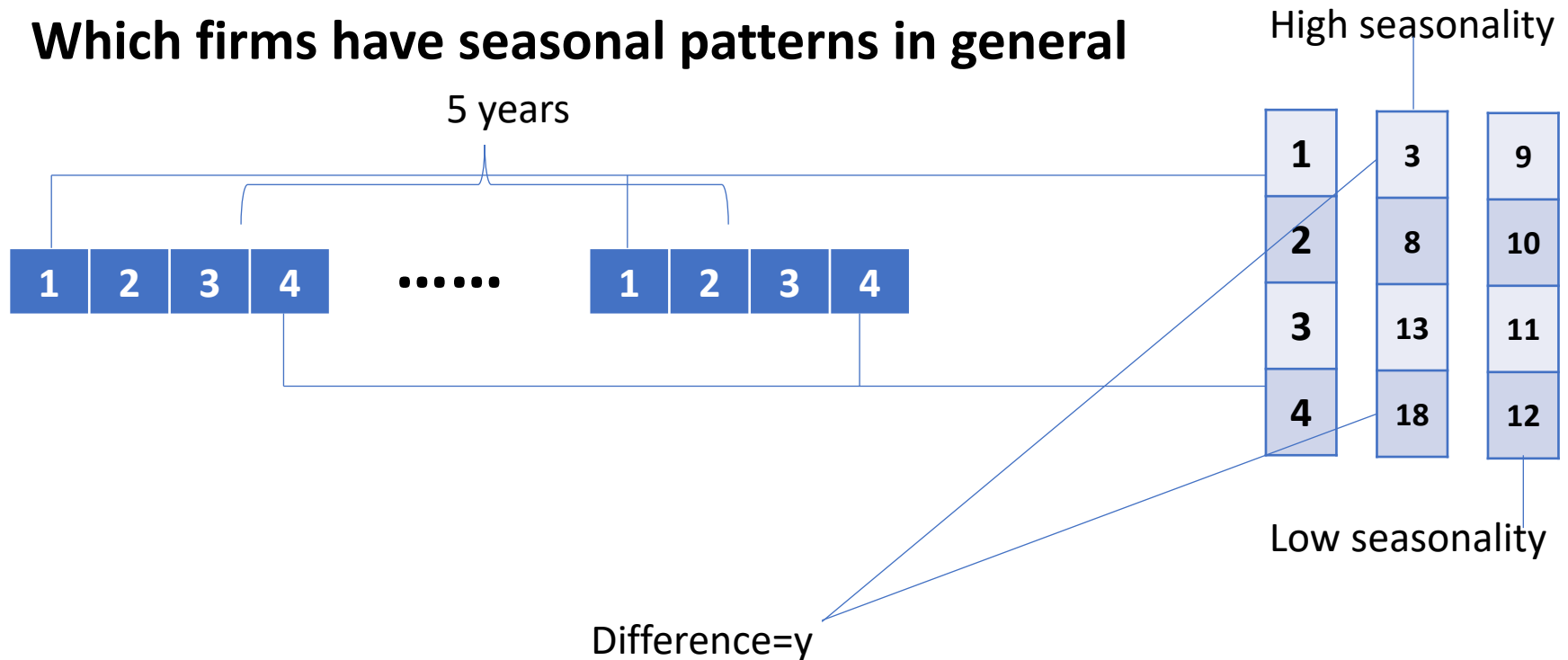
y: the change in *earnrank* between a firm's highest and lowest announcements over the calendar year

x: (the previous year)log market capitalization, share turnover, log book-to-market ratio, accruals and the log of firm age

4.Results_Q1.1

Dependent variable is the difference in *earnrank* between highest and lowest announcement over next year

Log market cap	0.098***	0.129***	0.031*
	(4.18)	(5.77)	(1.80)
Log book-to-market	0.391***	0.396***	0.155***
	(7.80)	(8.05)	(4.36)
Accruals	1.094***	0.952***	0.542***
	(3.84)	(3.60)	(3.08)
Turnover	−0.306***	−0.251***	−0.157***
	(−9.32)	(−7.84)	(−7.58)
Log age	0.576***	0.552***	0.417***
	(9.79)	(9.60)	(9.51)
Date fixed effects	No	Yes	Yes
Industry fixed effects	No	No	Yes
Observations	86,624	86,624	85,846
R^2	0.050	0.058	0.262

- seasonal shifts in earnings are more common for large firms, value firms, old firms, firms with low turnover, and firms with higher accruals

4.Results_Q1.2

Seasonality and the earnings announcement premium

- Frazzini and Lamont (2006): earnings announcement premium

- The portfolio of all stocks predicted to have an earnings announcement has abnormally positive returns

- Condition on an earnings announcement 12 months prior and sort firms based on *earnrank*

4.Results_Q1.2

Earnings seasonality and stock returns

Panel A: Summary statistics for portfolio returns

Weight	Earnings rank	Avg. return	Std. dev. returns
EW	1 (Low)	1.46	5.28
EW	5 (High)	1.75	5.14
EW	5–1	0.29	2.37
VW	1 (Low)	1.37	5.18
VW	5 (High)	1.76	5.18
VW	5–1	0.39	3.75

- ①the highest seasonality quintile earns larger return than the lowest quintile

- ②the lack of higher volatility of the highest quintile: the returns are not driven by differences in risk

4.Results_Q1.3

Effect of earnings seasonality versus other seasonal variables

- the dividend month premium (Hartzmark and Solomon 2013)

- return seasonality (Heston and Sadka 2008)：

Control variables：

- log market capitalization, log book-to-market, momentum, and last month's returns.

4.Results_Q1.3

Predicted earning ann.: dummy variable

Fama-Macbeth cross-sectional regressions using earnings seasonality

	Only firm months with predicted earnings				All firm months			
	1	2	3	4	5	6	7	8
Earnings rank (raw)	0.034***	0.034***			−0.017**	−0.012*		
	(2.78)	(2.95)			(−2.22)	(−1.69)		
Earnings rank (raw) * Predicted earnings ann.					0.051***	0.042***		
					(3.71)	(3.24)		
Earnings rank (pctile)			0.313**	0.329***			−0.199**	−0.133*
			(2.53)	(2.75)			(−2.51)	(−1.86)
Earnings rank (pctile) * Predicted earnings ann.							0.512***	0.421***
							(3.67)	(3.18)
Predicted earnings ann.					−0.156	−0.078	0.146	0.169*
					(−0.94)	(−0.51)	(1.53)	(1.92)
Predicted dividend		0.227***		0.226***		0.281***		0.280***
		(3.29)		(3.27)		(5.83)		(5.82)
Heston and Sadka (2008) seasonality		3.131***		3.105***		3.275***		3.266***
		(4.11)		(4.05)		(6.03)		(6.01)
Log market cap		0.019		0.019		−0.036		−0.036
		(0.54)		(0.55)		(−1.28)		(−1.27)
Log book-to-market		0.408***		0.411***		0.239***		0.238***
		(5.04)		(5.09)		(3.75)		(3.74)
Momentum		0.385**		0.385**		0.497***		0.497***
		(2.17)		(2.17)		(3.35)		(3.35)
Return ($t-1$)		−4.463***		−4.471***		−3.630***		−3.628***
		(−8.35)		(−8.35)		(−9.16)		(−9.15)
Avg. R^2	0.004	0.064	0.004	0.064	0.005	0.050	0.005	0.050
N	494	492	494	492	494	494	494	494

- Columns 1-4: The ***earnrank*** variable shows univariate significant predictive ability.

- Columns 5-8: Seasonality affects returns only in predicted earnings months

4.Results_Q1.4

Earnings seasonality and delayed reaction to firm-specific information

- Firm-specific shocks should become less relevant over time. Seasonality is property of a firm's underlying business model and should be persistent across time.

- Solve: lag the **_earnrank_** measure over different lengths of time

4.Results_Q1.4

2020

Lag=12:2014-2018 instead of 2015-2019

EARNRANK
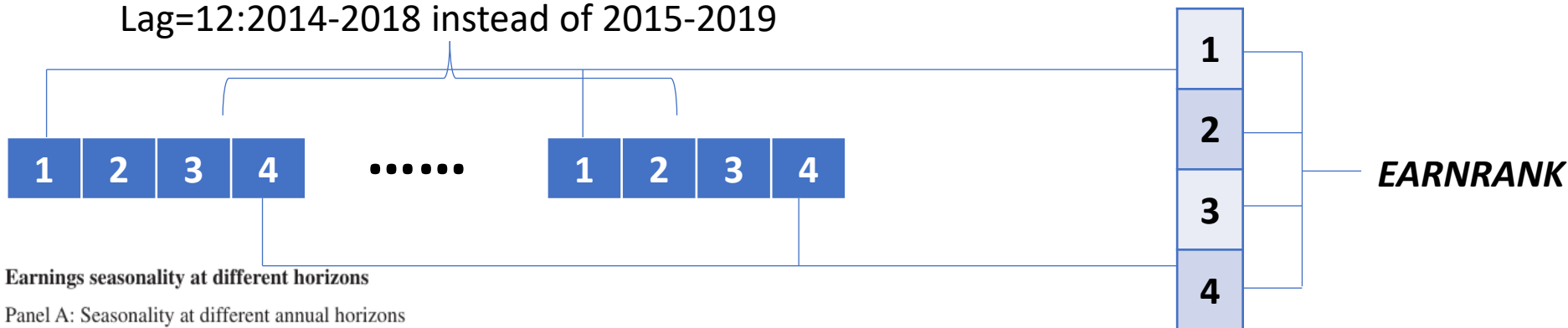
Earnings seasonality at different horizons

Panel A: Seasonality at different annual horizons

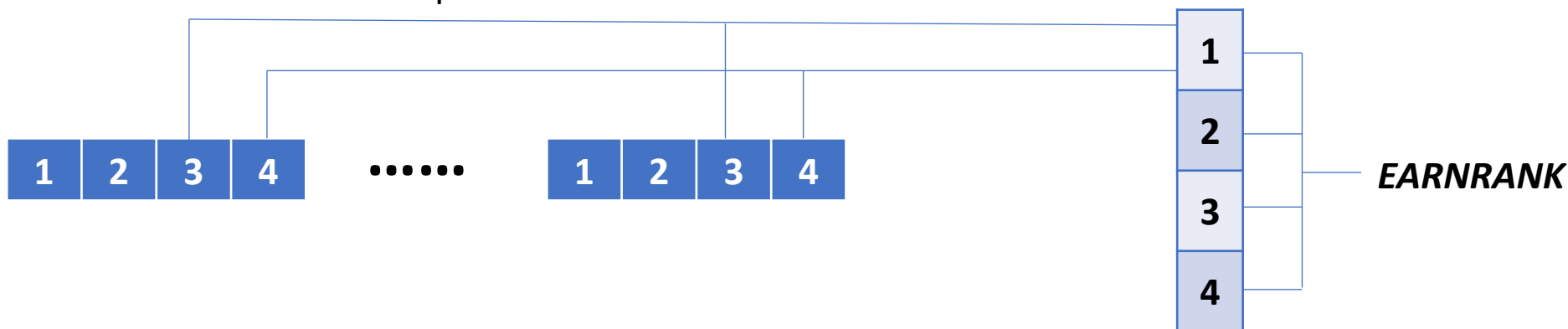| Earnings rank	Weighting	Months lagged									
		12	24	36	48	60	72	84	96	108	120
EW	1 (Low)	0.306***	0.167*	0.144	0.187**	0.167*	0.195*	0.277***	0.244**	0.290***	0.222**
		(3.35)	(1.89)	(1.61)	(1.99)	(1.66)	(1.92)	(2.84)	(2.30)	(2.83)	(2.04)
EW	5 (High)	0.653***	0.709***	0.692***	0.688***	0.642***	0.576***	0.552***	0.558***	0.561***	0.622***
		(6.98)	(7.81)	(7.39)	(7.27)	(6.27)	(5.79)	(5.33)	(5.28)	(5.19)	(5.54)
EW	5–1	0.347***	0.542***	0.548***	0.502***	0.475***	0.381***	0.275**	0.314***	0.271**	0.400***
		(3.13)	(4.83)	(4.86)	(4.50)	(4.06)	(3.07)	(2.33)	(2.63)	(2.25)	(3.16)
VW	1 (Low)	0.358***	0.218*	0.173	0.263*	0.223	0.297*	0.299**	0.253*	0.153	0.321**
		(2.77)	(1.69)	(1.26)	(1.86)	(1.46)	(1.76)	(2.01)	(1.68)	(0.98)	(1.98)
VW	5 (High)	0.909***	0.900***	0.810***	0.736***	0.693***	0.796***	0.716***	0.688***	0.665***	0.706***
		(6.03)	(6.28)	(5.31)	(4.96)	(4.46)	(4.66)	(4.23)	(4.35)	(3.93)	(4.26)
VW	5–1	0.551***	0.682***	0.637***	0.473***	0.470**	0.500**	0.418**	0.435**	0.513**	0.385*
		(3.14)	(4.00)	(3.25)	(2.53)	(2.31)	(2.09)	(2.03)	(2.11)	(2.37)	(1.71)

- statistically significant abnormal returns are evident even when using information 10 years before the portfolio formation date.

4.Results_Q1.4

- If our results are driven by seasonality in earnings, then **earnrank** will positively predict returns for the same quarter as the measure but not similarly predict returns for other quarters.

Predict: 2020's quarter 1
Use: 2015-2019's quarter 4 or 3 or 2

| 1 | 2 | 3 | 4 | ······ | 1 | 2 | 3 | 4 |

| 1 |
| 2 |
| 3 |
| 4 |

EARNRANK

4.Results_Q1.4

Panel B: Seasonality at different quarterly horizons

Weighting	Earnings rank	Months lagged							
		3	6	9	12	15	18	21	24
EW	1 (Low)	0.220***	0.081	0.317***	0.306***	0.376***	0.138*	0.460***	0.167*
		(2.68)	(1.01)	(3.94)	(3.35)	(4.45)	(1.69)	(4.88)	(1.89)
EW	5 (High)	0.221***	0.425***	0.300***	0.653***	0.153*	0.399***	0.249***	0.709***
		(2.69)	(5.20)	(3.66)	(6.98)	(1.82)	(4.78)	(2.98)	(7.81)
EW	5–1	0.001	0.344***	−0.016	0.347***	−0.223**	0.261***	−0.211*	0.542***
		(0.01)	(3.53)	(−0.17)	(3.13)	(−2.15)	(2.69)	(−1.93)	(4.83)
VW	1 (Low)	0.461***	−0.014	0.673***	0.358***	0.519***	−0.040	0.748***	0.218*
		(3.23)	(−0.10)	(5.06)	(2.77)	(3.26)	(−0.24)	(5.25)	(1.69)
VW	5 (High)	0.388***	0.367**	0.081	0.909***	0.359***	0.352**	−0.009	0.900***
		(2.92)	(2.17)	(0.63)	(6.03)	(2.93)	(2.21)	(−0.07)	(6.28)
VW	5–1	−0.073	0.381	−0.593***	0.551***	−0.160	0.393*	−0.757***	0.682***
		(−0.40)	(1.60)	(−3.28)	(3.14)	(−0.79)	(1.70)	(−4.13)	(4.00)

- These results are difficult to reconcile with seasonality measuring firm-specific information flows common to recent earnings announcements.

4.Results_Q2.1

From risk:

- Salamon & Stober (1994): high seasonal quarters involve more resolution of uncertainty, which could come from either systematic or idiosyncratic factors.

- Savor and Wilson (2016): there is a systematic component to earnings announcement risk and that **the portfolio of firms with expected earnings announcements represents a priced factor** that proxies for the systematic component of earnings announcement risk.
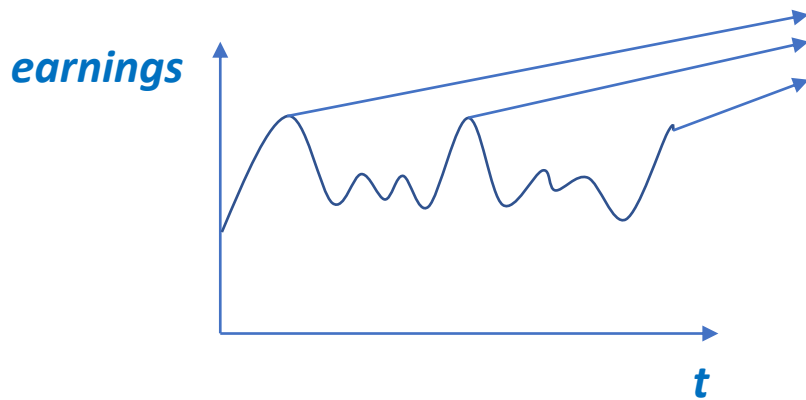
4.Results_Q2.1

- ***EARNRF***: the excess returns of an equal-weighted portfolio of firms with a predicted earnings announcement that month

Panel A: Equal-weighted

Earnings rank	Intercept	MKTRF	SMB	HML	UMD	EARNRF	R^2	N
1 (Low)	0.017	−0.065	−0.146***	0.180***	−0.001	1.039***	0.910	492
	(0.22)	(−0.94)	(−2.75)	(6.20)	(−0.06)	(15.11)		
2	0.010	0.064	0.040	0.104***	0.010	0.965***	0.939	492
	(0.14)	(1.03)	(0.84)	(4.02)	(0.69)	(15.70)		
3	−0.001	−0.021	−0.033	−0.014	−0.002	1.049***	0.940	492
	(−0.01)	(−0.35)	(−0.70)	(−0.55)	(−0.15)	(17.12)		
4	0.120*	0.092	0.024	0.011	0.065***	0.917***	0.941	492
	(1.81)	(1.56)	(0.54)	(0.45)	(4.57)	(15.69)		
5 (High)	0.361***	−0.089	−0.248***	0.100***	−0.011	1.051***	0.899	492
	(4.50)	(−1.24)	(−4.53)	(3.34)	(−0.62)	(14.82)		
5–1	0.344***	−0.024	−0.102	−0.080*	−0.010	0.013	0.020	492
	(3.00)	(−0.23)	(−1.30)	(−1.87)	(−0.40)	(0.12)		

- Exposure to an overall earnings risk factor does not drive the seasonality effect

4.Results_Q2.1

earnings

Theoretically, We shouldn't be surprised, since we already know it will happen

t

Regression:

- y: (Actual EPS −Forecast EPS) / Price(t−3)

4.Results_Q2.1

Panel A: Seasonality and analyst forecast errors

Dependent variable is forecast error: earnings per share minus median analyst forecast, divided by price.

Earnings rank	0.032***	0.023***	0.017***	0.012***	0.013***	0.014***	0.013***
	(11.43)	(9.27)	(7.34)	(5.19)	(5.00)	(5.73)	(5.15)
Log (# estimates)		0.061***	−0.103***	−0.071***	−0.074***	−0.083***	−0.096***
		(6.13)	(−8.09)	(−6.79)	(−7.04)	(−5.59)	(−6.38)
Forecast dispersion		−0.443***	−0.423***	−0.300***	−0.296***	−0.324***	−0.313***
		(−16.42)	(−15.37)	(−12.73)	(−12.57)	(−14.18)	(−13.84)
Single estimate (dummy)		−0.467***	−0.441***	−0.277***	−0.258***	−0.281***	−0.258***
		(−13.10)	(−12.59)	(−9.64)	(−8.83)	(−8.96)	(−8.30)
Forecast error $(t-1)$				0.168***	0.165***	0.086***	0.082***
				(14.74)	(14.25)	(7.15)	(6.81)
Forecast error $(t-2)$				0.097***	0.097***	0.043***	0.044***
				(7.48)	(7.22)	(2.97)	(2.91)
Forecast error $(t-3)$				0.045***	0.046***	−0.001	0.000
				(3.89)	(3.89)	(−0.08)	(0.00)
Forecast error $(t-4)$				0.054***	0.053***	0.009	0.008
				(4.71)	(4.51)	(0.75)	(0.66)
Stock characteristics	No	No	Yes	Yes	Yes	Yes	Yes
Date fixed effects	No	No	No	No	Yes	No	Yes
Stock fixed effects	No	No	No	No	No	Yes	Yes
Observations	180,184	180,184	176,508	159,133	159,133	159,133	159,133
R^2	0.001	0.129	0.143	0.190	0.205	0.242	0.081

- Column 1: the earnings forecast error is more positive when seasonality is higher
- Columns 2–4: the effect of seasonality survives adding firm-level controls
- Columns 5–7: add date and firm fixed effects——the effect of seasonality on forecast errors is not due to particular firm characteristics or time periods

4.Results_Q2.2

From mispricing

- Markets are underweighting earnings seasonality information——but why?

- Tversky and Kahneman (1973): individuals estimate probabilities according to the ease with which instances of the particular event can be brought to mind; *the recency of data* is one of the attributes that may make a particular event more likely to be recalled
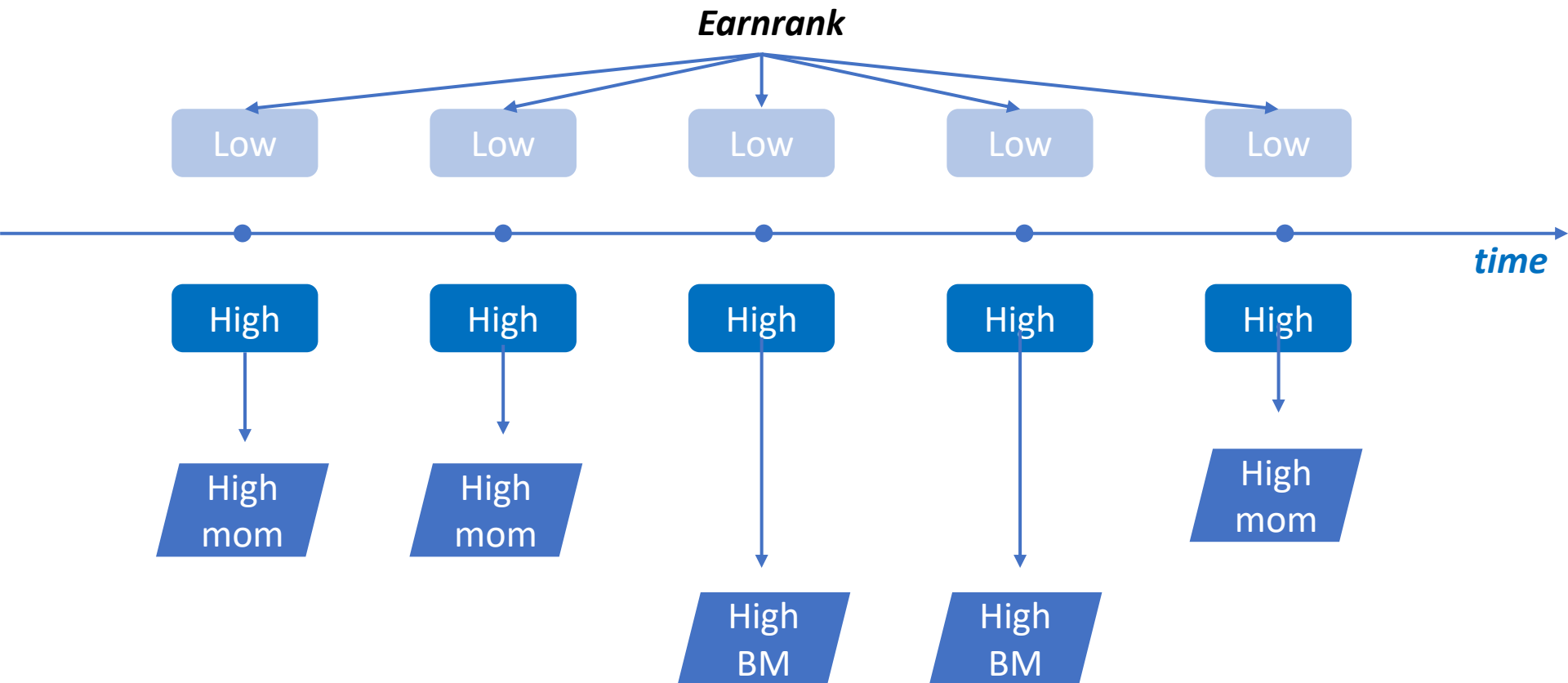
4.Results_Q2.2

- ①First sort: whether they are above or below the median earnings rank for that month

- ②Second sort: the difference between the average earnings in the three most recent announcements before portfolio formation

Panel A: Gap between recent earnings and 12 months ago

Gap between earnings (3, 6, 9) months ago and 12 months ago	Equal-weighted			
		Earnings rank level		
	All	1 (Low)	2 (High)	2–1
All		0.270***	0.496***	0.226***
		(4.18)	(7.60)	(3.31)
		{493}	{493}	{493}
1 (non-annual earnings more negative)	0.004	−0.312***	0.340***	0.651***
	(0.06)	(−3.29)	(4.55)	(6.54)
	{492}	{462}	{483}	{462}
2 (non-annual earnings more positive)	0.604***	0.511***	0.806***	0.277***
	(8.46)	(6.39)	(8.77)	(2.98)
	{492}	{473}	{467}	{466}
2–1	0.600***	0.831***	0.457***	−0.368***
	(8.04)	(7.81)	(4.95)	(−2.88)
	{492}	{462}	{467}	{461}

4.Results_Q2.3

- As proxies of basic factors(time varying)

4.Results_Q2.3

- $R_{HighEarnRank} - R_{LowEarnRank}$

$= \alpha + \beta_1 * MktRf * Jan + \beta_2 * MktRf * Feb + \ldots\ldots$

$+ \beta_{12} * MktRf * Dec + \beta_{13} * SMB * Jan + \ldots\ldots$
$+ \beta_{24} * SMB * Dec + \beta_{15} * HML * Jan + \ldots\ldots$
$+ \beta_{36} * HML * Dec + \beta_{37} * UMD * Jan + \ldots\ldots$
$+ \beta_{48} * UMD * Dec + e_t$

4.Results_Q2.3

Earnings seasonality and time-varying factor loadings

Earnings rank	(VW) intercept	(EW) intercept	Factor (MKTRF, SMB, HML, UMD) * Month controls	(EW) R^2	N
1 (Low)	0.419*** (3.02)	0.313*** (3.30)	Yes	0.889	492
2	0.197 (1.52)	0.269*** (3.02)	Yes	0.916	492
3	0.292* (1.84)	0.260*** (2.91)	Yes	0.917	492
4	0.128 (0.95)	0.318*** (3.98)	Yes	0.929	492
5 (High)	0.770*** (5.07)	0.632*** (6.55)	Yes	0.879	492
5–1	0.351** (1.97)	0.319*** (2.74)	Yes	0.156	492

- time-varying loadings on standard factors do not explain the seasonality effect

5.Conclusions

- Stocks exhibit higher returns in months when they are predicted to announce seasonally larger earnings.

- The returns are related to mistaken estimates of earnings.

- Also, it is related to the tendency of investors to underreact to predictable information in earnings seasonality.