Diversifying Labor Income Risk: Evidence from Income Pooling

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Motivation

- Human capital represents nearly two-thirds of an individual's total wealth
- Individuals face substantial fluctuations in lifetime labor income which has become increasingly volatile(Guvenen *et al.*, 2021, 2022)
- Limited options for individuals to hedge labor income risk
  1. Unemployment insurance
  2. Occupational sorting
- **This paper:** Studies the selection and effects of private labor market insurance in professional baseball
- Contract Mechanism: Individuals hedge future earnings by agreeing to share a portion of future income with others

Goals and Inputs

Goals

- Analyze selection into private labor market insurance contracts
- Examine effects of private labor market insurance on individual productivity
  - Heterogeneous effects by choice of contracting peers

Inputs

- Contract data from a private insurance provider regarding individuals' choice of peers and timing of contract
- Baseball performance measures regarding player output and efficiency

Benefits

1. Measures of player quality
2. High-frequency measures of observable performance

Main Results

1. Selection into private insurance contracts correlated with an individual's level of downside protection and sophistication
2. Individuals with insurance take-up are of lower ability
3. Players' insurance pools are largely homogeneous
4. Performance declines for individuals after signing up
   - Declines offset when contracting with closer peers

- Take-away: Individuals can hedge labor income risk collectively when *monitoring* is present

What is Baseball?

Major League Baseball Structure

- Major League Baseball (MLB) is the top professional baseball league consisting of 30 affiliates across the United States and Canada itemize
- 2022, MLB revenue of nearly $11 billion (Blum, 2023)
- MLB affiliates have developmental, minor league teams across four main levels
  - 2022, about 5,000 players across 165 teams

Source: Marquee Sports Network

Minor League Baseball Player Acquisition

- MLB affiliates acquire players to their minor league teams by:
  1. Drafting players in the annual MLB draft (for domestic players)
     - Eligibility: HS graduate, 1 year after junior college, or turning 21 or 3 years at a 4-year university
  2. Signing players through free agency (for international players)
     - Eligibility: $>$ 16 years old
- Average (median) signing bonus in 2022 MLB draft just over \$500,000 (\$130,000) Bonus Plot

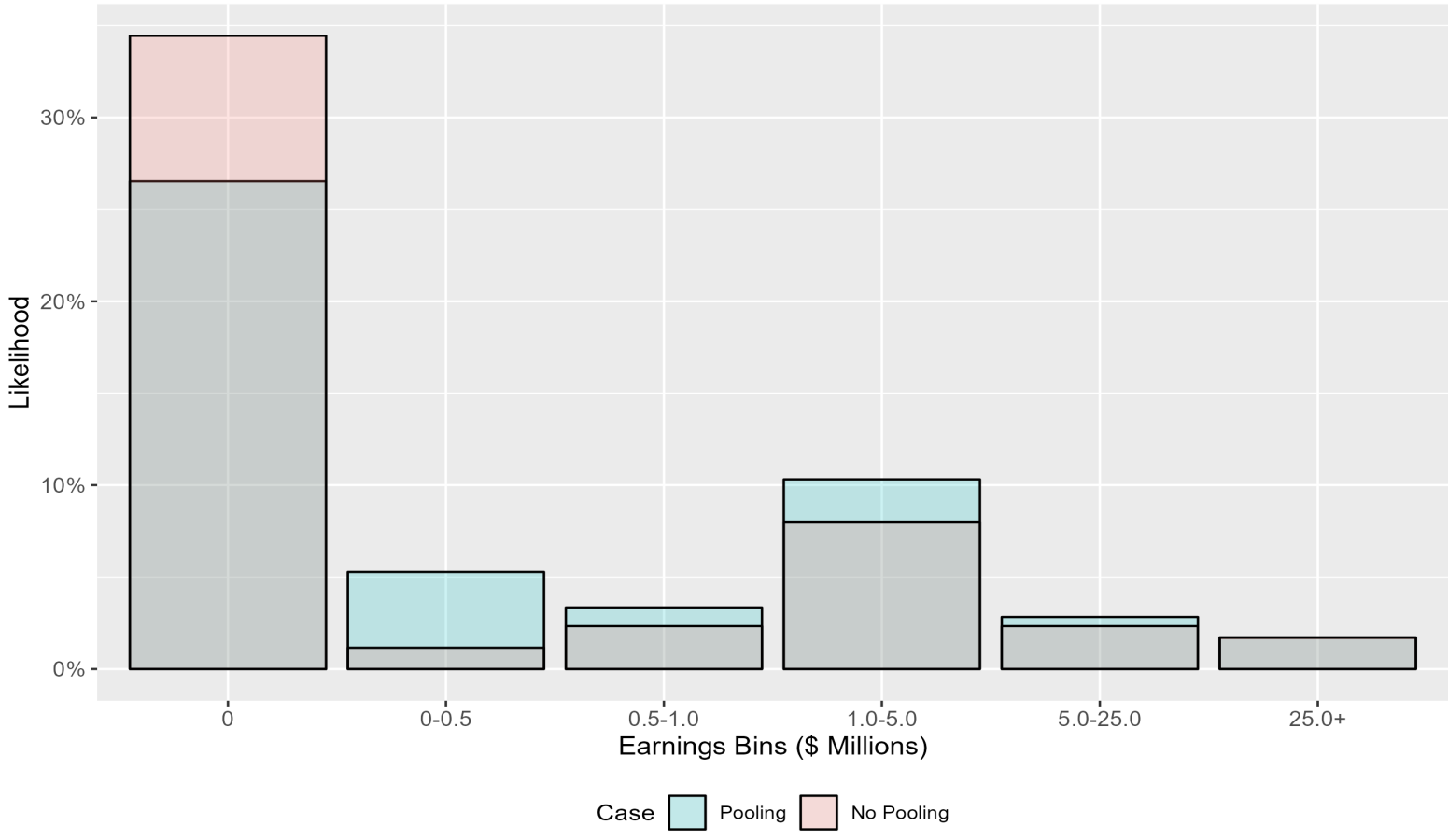
Minor League Baseball Labor Market

- Labor market features significant bargaining power for MLB affiliates and established, MLB players
- Until 2022, minor league baseball players made between $5,000-$15,000 annually
- Tournament incentives: Only 10 percent of minor league baseball players ever make it to the Major Leagues
  - Average MLB player earned $4.2 million in 2022
- Idiosyncratic risk: MLB? Earnings?
  - 1st round player: 65% chance of making the Major Leagues; $20.28 million expected career earnings
  - 5th round player: 31% chance of making the Major Leagues; $3.46 million expected career earnings

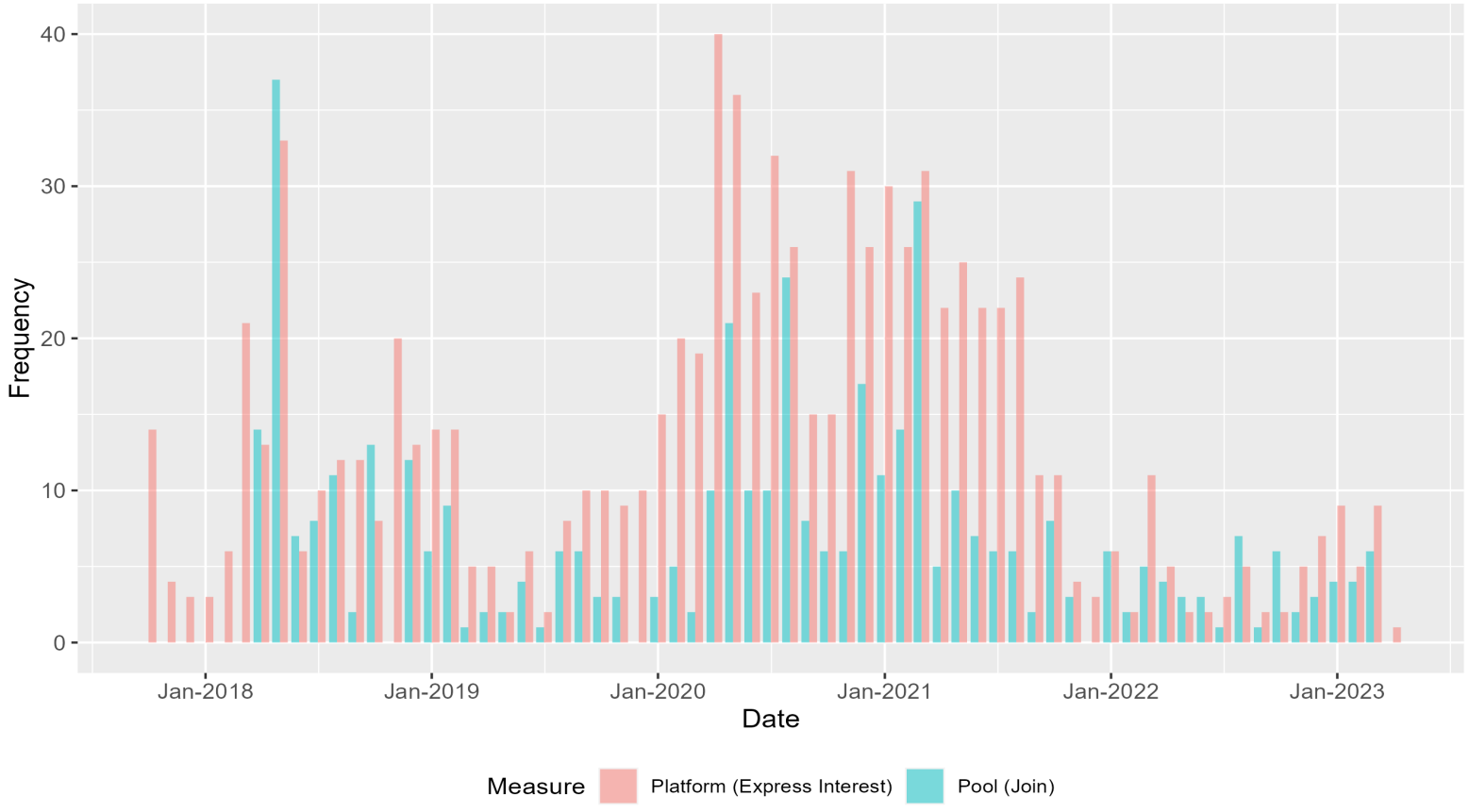
Private Labor Insurance: Income Pooling Agreements

- Private labor market insurance offered to minor league players in 2017
- Income pooling: Players agree to pay a portion of their future income beyond a hurdle rate into a common pool shared among other players
  - Exchange $\approx$ 15% of salary beyond 3 years' MLB earnings with other players in your pool
  - Free origination but the company takes 10 percent of pool contributions
  - Provide "labor" insurance through mechanism of reduced pay-performance sensitivity
- Two-step process:
  1. "Platforming": Players express formal interest in joining an income pool
     - Company facilitates matching process and offers potential pooling partners
  2. "Pooling": Players join an existing pool or enter a new pool with other players

Pooling Versus Non-Pooling Example Distribution



Income Pooling Frequency



- 864 players "platform" (5%) and 425 players "pool" (2.5%) from 2017-2023

Timing | Pool Size | Platform Conversion

Selection Differences: Platformers vs Population

Regression

	Platformers (N = 864)	Non-Platformers (N = 18,174)	Diff.
	Mean	Mean	Mean
Panel A: Player Characteristics			
Demographics			
Entry Age	19.23	19.75	-0.52***
US Origin	0.40	0.48	-0.08***
Draft Characteristics			
Round Number	19.33	15.41	3.92***
Bonus ($100,000)	2.09	5.56	-3.46***
Drafted College	0.88	0.70	0.17***
Panel B: Playing Characteristics			
Hitting Statistics			
Average OPS	0.70	0.66	0.04***
Average PA	203.18	185.76	17.43***
Pitching Statistics			
Average ERA	4.02	5.04	-1.02***
Average IP	40.97	37.19	3.79***
Panel C: Platforming Characteristics			
Time to Platform	2.42	-	-

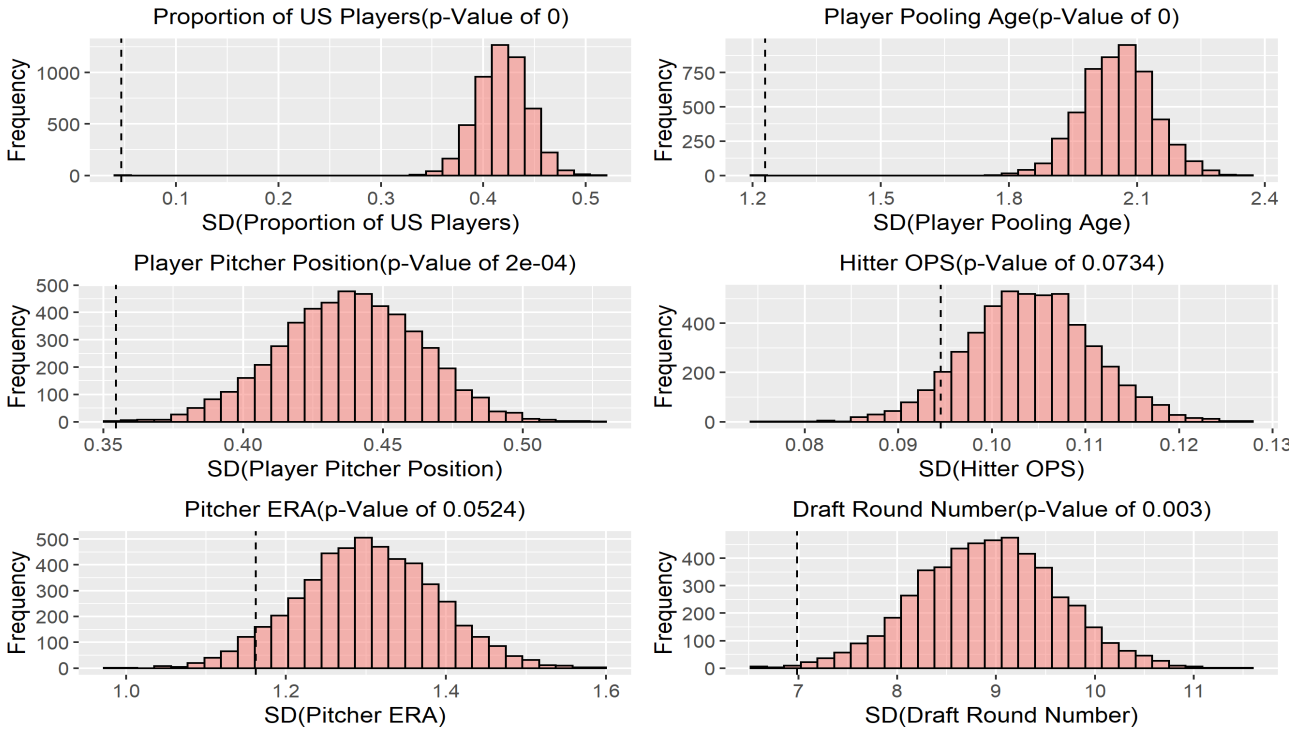
Selection Differences: Poolers vs Platformers

Regression

	Poolers (N = 425)	Platformers (N = 439)	Difference
	Mean	Mean	Mean
	Panel A: Player Characteristics		
Demographics			
Entry Age	19.19	19.27	-0.09
US Origin	0.38	0.42	-0.04
Draft Characteristics			
Round Number	21.23	17.65	3.58**
Bonus ($100,000)	1.36	2.63	-1.27*
Drafted College	0.92	0.84	0.07*
	Panel B: Playing Characteristics		
Hitting Statistics			
Average OPS	0.70	0.70	-0.00
Average PA	190.03	215.95	-25.92**
Pitching Statistics			
Average ERA	3.90	4.15	-0.25
Average IP	40.11	41.83	-1.72
	Panel C: Platforming Characteristics		
Time to Platform	2.42	3.06	-0.64***

Pooling Partner Choice?

- How do players attempt to mitigate potential pooling frictions stemming from asymmetric information and cash flow based risk?
  - Dotted line denotes average σ based on *actual* pooling partners
  - Histogram denotes distribution of bootstrapped average σ based on *randomized* pooling partners



Productivity Changes Following Pooling?

- Ambiguous effects of income pooling on performance
- Positive Effect:
  1. Reducing player stress
  2. Increasing information sharing and collaboration
- Negative Effect:
  1. Free-riding incentives stemming from reduced pay-for-performance sensitivity (Andreoni, 1988)

OLS Estimator

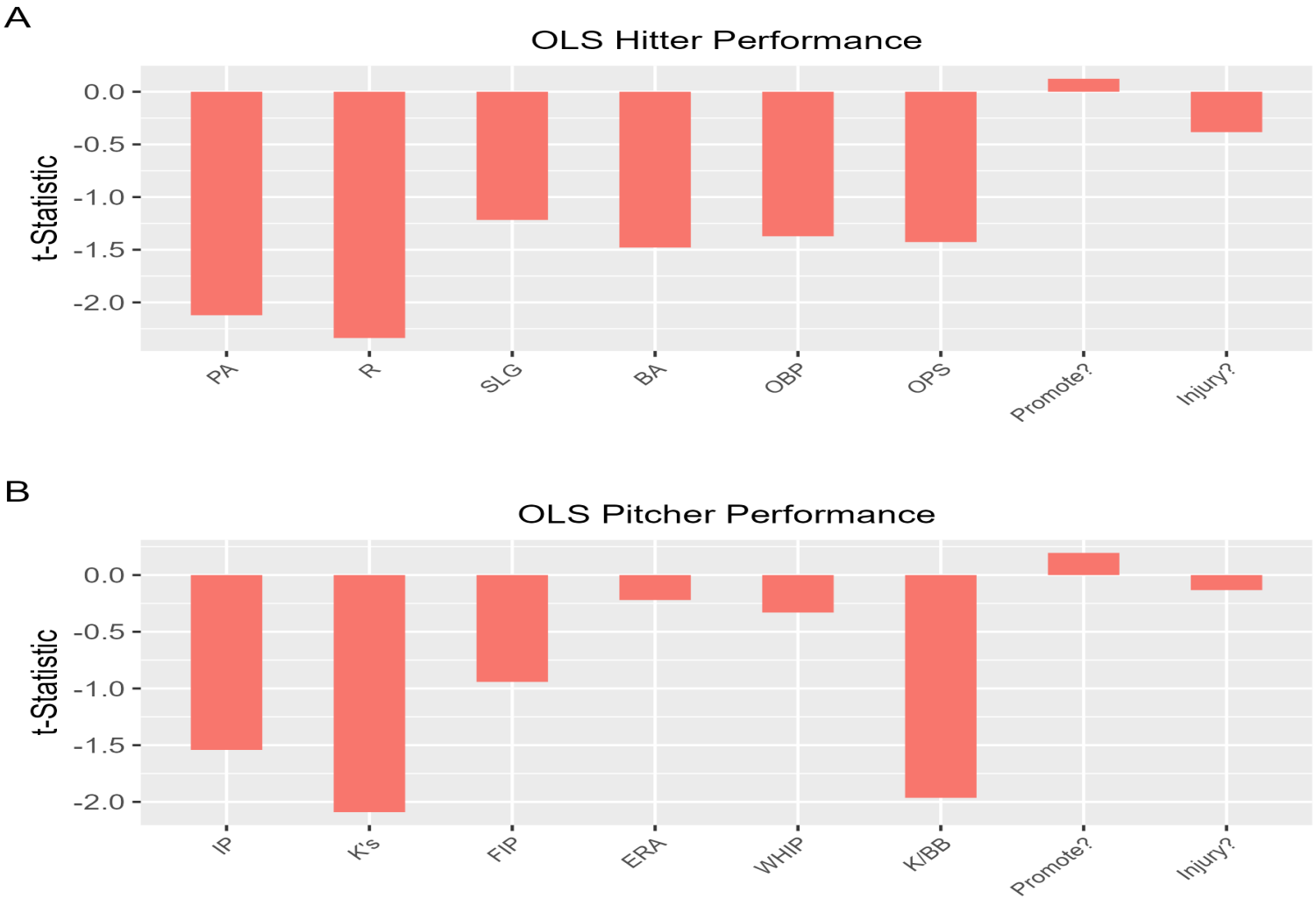
1. Begin with a design comparing changes in productivity for players post-pooling to control group

$$Performance_{i,j,k,m,y} = \beta_0 + \beta_1 Treat_i \times Post_{m,y} + \mathbf{X}_{i,j,k,y} + \gamma_i + \delta_{m,y} + \tau_{j,m} + \rho_k + \epsilon_{i,j,k,m,y} \quad (1)$$

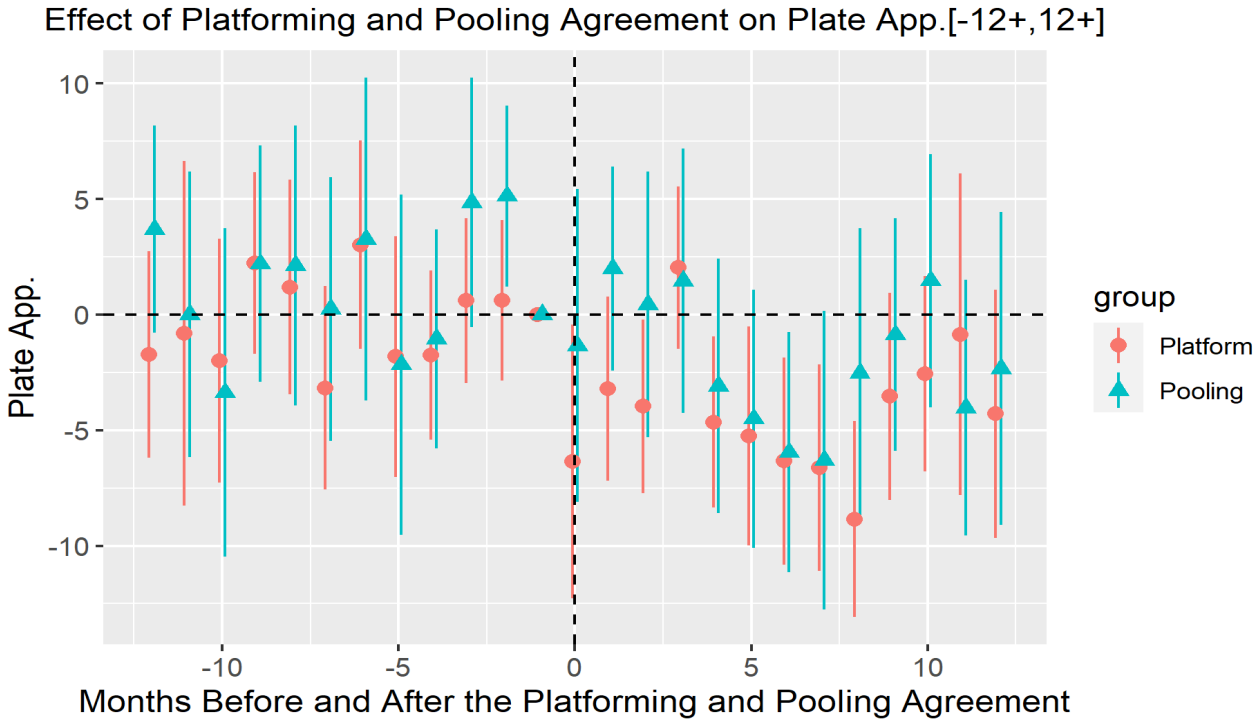
   - i: player, j: level, k: MLB affiliate, m: month, y: year

2. Regression results display productivity measures consisting of playing time, playing efficiency, promotion, and injury

OLS Changes in Productivity Hitters & Pitchers



Violation of Non-Random Adoption Timing



- Players more likely to platform when experiencing a decline in playing time or injury in the prior month Regression Table

Empirical Strategy

- Ideal experiment: randomly assign individuals into income pooling groups or provide random exposure to individuals
- My design: Use quasi-random exposure to pooling for a focal player based on his peers' platforming decision
- Use two separate instruments based on lagged proportion of platformed peers from:
  1. Focal player's birth location
  2. Focal player's Major League Affiliate

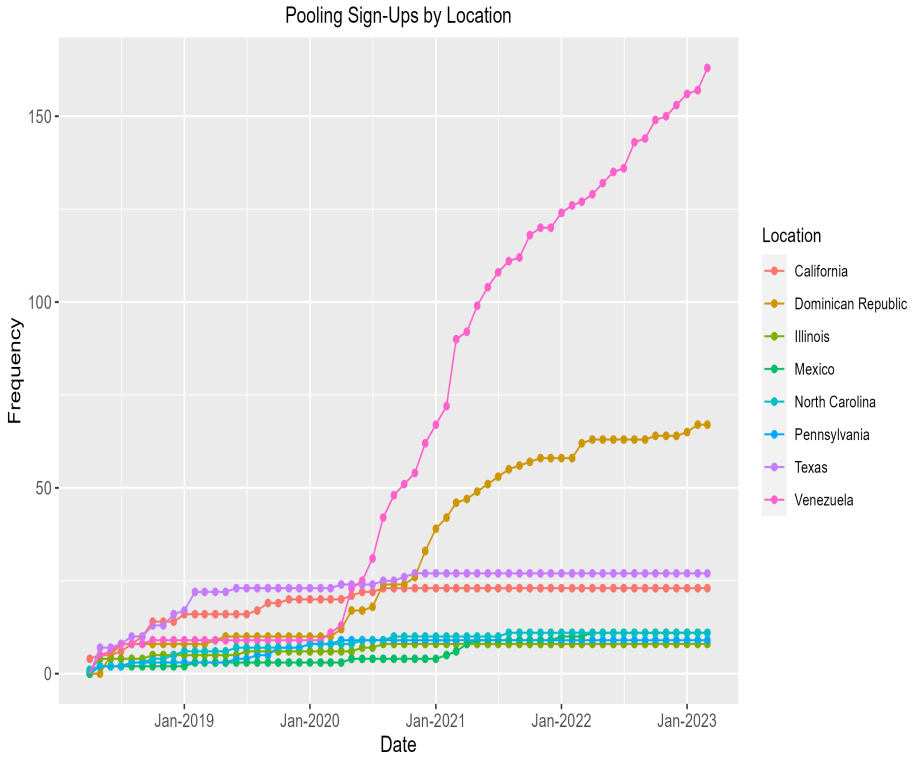
First-Stage

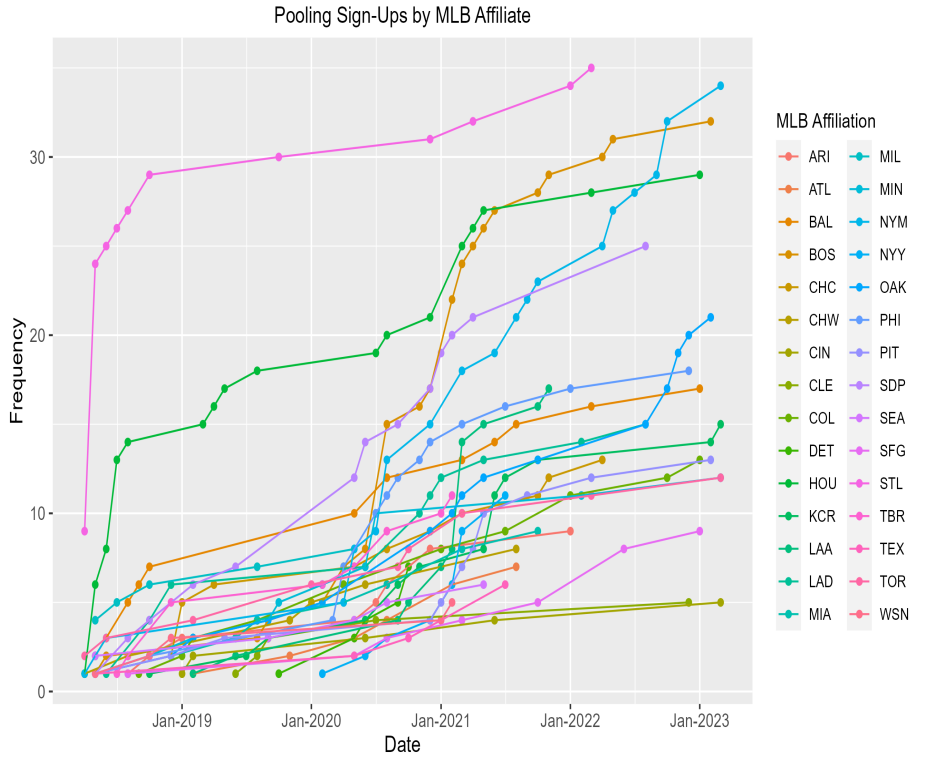
$$Treat_i \times Post_{m,y} = \alpha_2 + \beta_2 Instrument_{i,(m,y)-1} + \mathbf{X}_{i,j,k,y} + \gamma_i + \delta_{m,y} + \tau_{j,m} + \rho_k + \epsilon_{i,j,k,m,y} \quad (2)$$

Second-Stage

$$Performance_{i,j,k,m,y} = \alpha_3 + \beta_3 \widehat{Treat_i \times Post}_{m,y} + \mathbf{X}_{i,j,k,y} + \gamma_i + \delta_{m,y} + \tau_{j,m} + \rho_k + \epsilon_{i,j,k,m,y} \quad (3)$$

Instrument Relevance





- First stage F-statistic $\approx$ 25-40 in full sample; $\approx$ 15-25 in position groups

  Regression Table

- Institutional details provide support for independence assumption

Exclusion Restriction

- Focal player's lagged peers' decisions can impact his performance only through shifting his decision to pool

- I provide evidence in support of the exclusion restriction based on:
  - Placebo tests on individuals exposed to peers' decisions but not targeted by income pooling

Placebo Test in Support of Exclusion Restriction

- Include only current MLB players:
  - Benefit: Exposed to time-varying shocks (e.g. country × month) but not targeted by the income pooling company

	Panel A: Hitter Monthly Performance					
	Output		Efficiency		Margin	
	PA	R	BA	OPS	Promote?	Injury
	(1)	(2)	(3)	(4)	(5)	(6)
Location Instrument Quartile	-0.03	0.04	0.00	0.00	0.00	0.00
	[0.47]	[0.09]	[0.00]	[0.00]	[0.00]	[0.00]
Observations	4927	4927	4908	4908	4917	4927
R^2	0.43	0.40	0.27	0.25	0.25	0.17
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Y-Mean	86.91	11.10	0.39	0.71	0.22	0.11
Y-SD	29.74	5.43	0.13	0.18	0.41	0.32

Effect of Pooling on Performance: Peer Location IV

	Combined Panel: IV Hitter and Pitcher Monthly Performance							
	Hitter				Pitchers			
	Output		Efficiency		Output		Efficiency	
	PA	R	BA	OPS	IP	K's	ERA	K/BB
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post × Pool	-45.82*	-8.03*	-0.08*	-0.16	-12.87**	-10.76**	1.91*	-1.90**
	[26.71]	[4.05]	[0.04]	[0.12]	[4.99]	[4.87]	[1.11]	[0.83]
Observations	118066	118066	117889	117889	126194	126194	126011	116697
Instrument	Loc.	Loc.	Loc.	Loc.	Loc.	Loc.	Loc.	Loc.
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-Statistic	22.94	22.94	22.84	22.84	29.35	29.35	29.29	27.81
Y-Mean	59.35	7.27	0.24	0.68	12.05	11.64	4.28	2.84
Y-SD	33.88	5.22	0.08	0.20	7.55	7.31	3.26	1.98

1. Decline in playing time, output, and efficiency for both hitters and pitchers
2. Local average treatment effect (LATE): Estimate causal for players complying with locational peers' platforming decisions

Effect of Pooling on Performance: Peer Teammate IV

	Combined Panel: IV Hitter and Pitcher Monthly Performance							
	Hitter				Pitchers			
	Output		Efficiency		Output		Efficiency	
	PA	R	BA	OPS	IP	K's	ERA	Promote?
	(1)	(3)	(4)	(6)	(2)	(5)	(8)	(7)
Post × Pool	-0.82	3.81	0.07	0.24	2.68	-2.23	2.73	-1.38
	[20.77]	[4.65]	[0.06]	[0.18]	[3.92]	[3.86]	[1.90]	[1.13]
Observations	118066	118066	117889	118066	126194	126194	126011	116697
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instrument	Aff.	Aff.	Aff.	Aff.	Aff.	Aff.	Aff.	Aff.
F-Statistic	12.50	12.50	12.54	12.50	20.12	20.12	20.17	20.12
Y-Mean	59.35	7.27	0.24	0.68	12.05	11.64	4.28	2.84
Y-SD	33.88	5.22	0.08	0.20	7.55	7.31	3.26	1.98

1. Monitoring Channel: Limited changes in player performance when induced to pool with teammates Mechanism
2. Local average treatment effect (LATE): Estimate causal for players complying with Major League Affiliate peers' platforming decisions

Conclusion

1. Selection into private insurance contracts correlated with an individual's level of downside protection and sophistication
2. Individuals that sign-up are of a lower time-invariant ability level
   - Significantly more likely to be injured or experience decline in playing time before expressing interest
3. Players' insurance pools are largely homogeneous
   - Players contract with others of similar ability, backgrounds, and occupations to mitigate information asymmetries and cash-flow based risk
4. Performance declines for individuals after signing up
   - Declines offset when contracting with closer peers

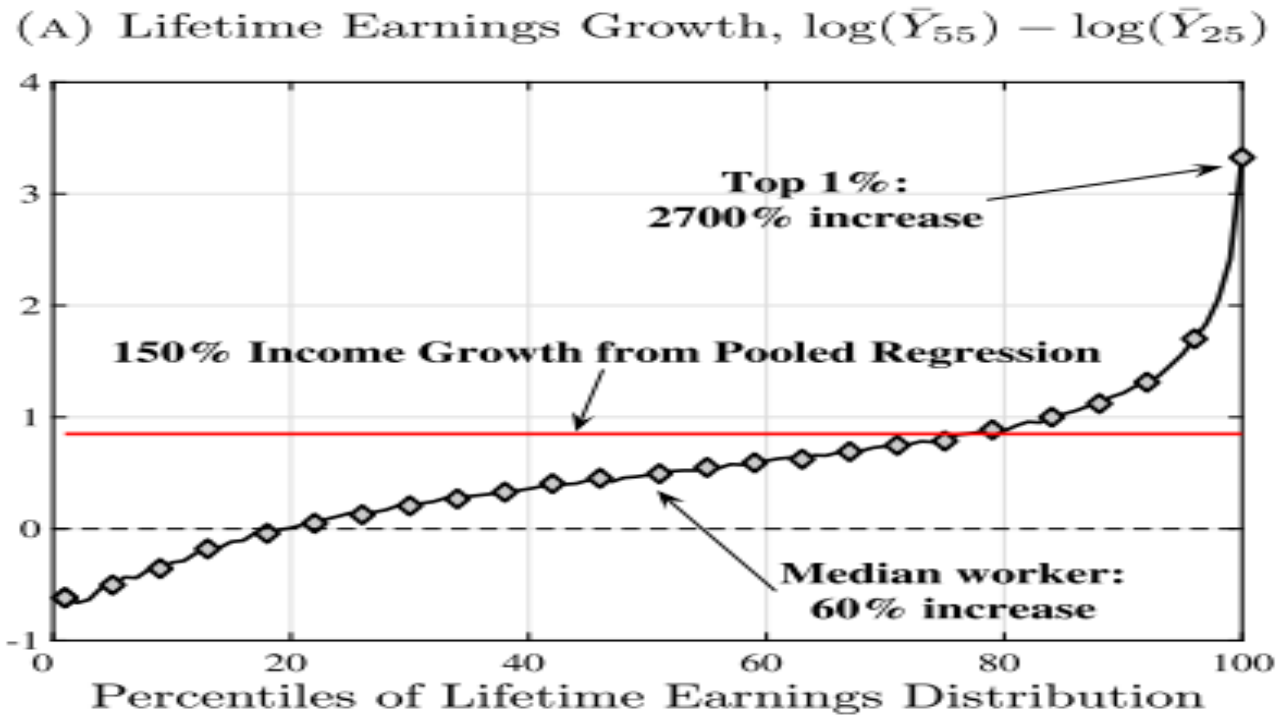
Andreoni, James. 1988. Why free ride?: Strategies and learning in public goods experiments. *Journal of public Economics*, **37**(3), 291–304.

Blum, Ronald. 2023 (Feb). *MLB average salary rose 14.8% to record $4.22m last season*.

Guvenen, Fatih, Karahan, Fatih, Ozkan, Serdar, & Song, Jae. 2021. What do data on millions of US workers reveal about lifecycle earnings dynamics? *Econometrica*, **89**(5), 2303–2339.

Guvenen, Fatih, Kaplan, Greg, Song, Jae, & Weidner, Justin. 2022. Lifetime earnings in the united states over six decades. *American Economic Journal: Applied Economics*, **14**(4), 446–479.

Lifetime Earnings Growth



Source: Guvenen *et al.* (2021)

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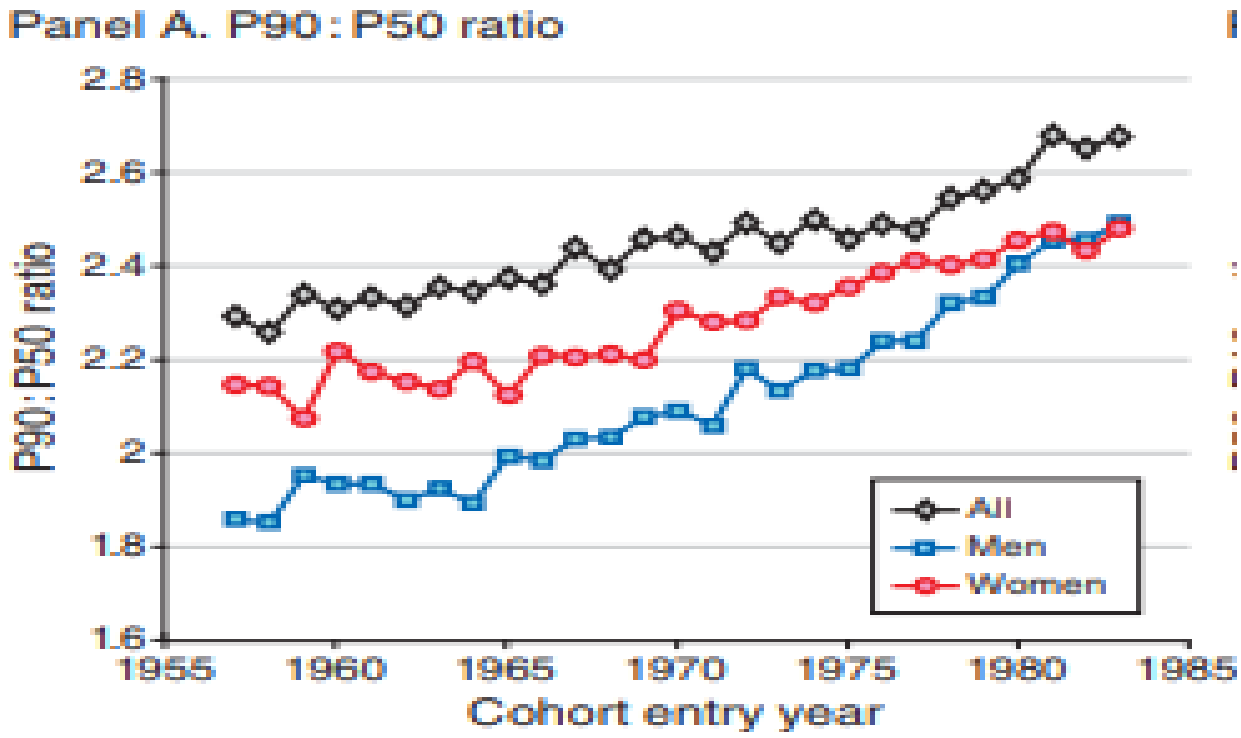
Increasing Earnings Inequality



Source: Guvenen *et al.* (2022)

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MLB Map

Source: https://sportleaguemaps.com/baseball/mlb/

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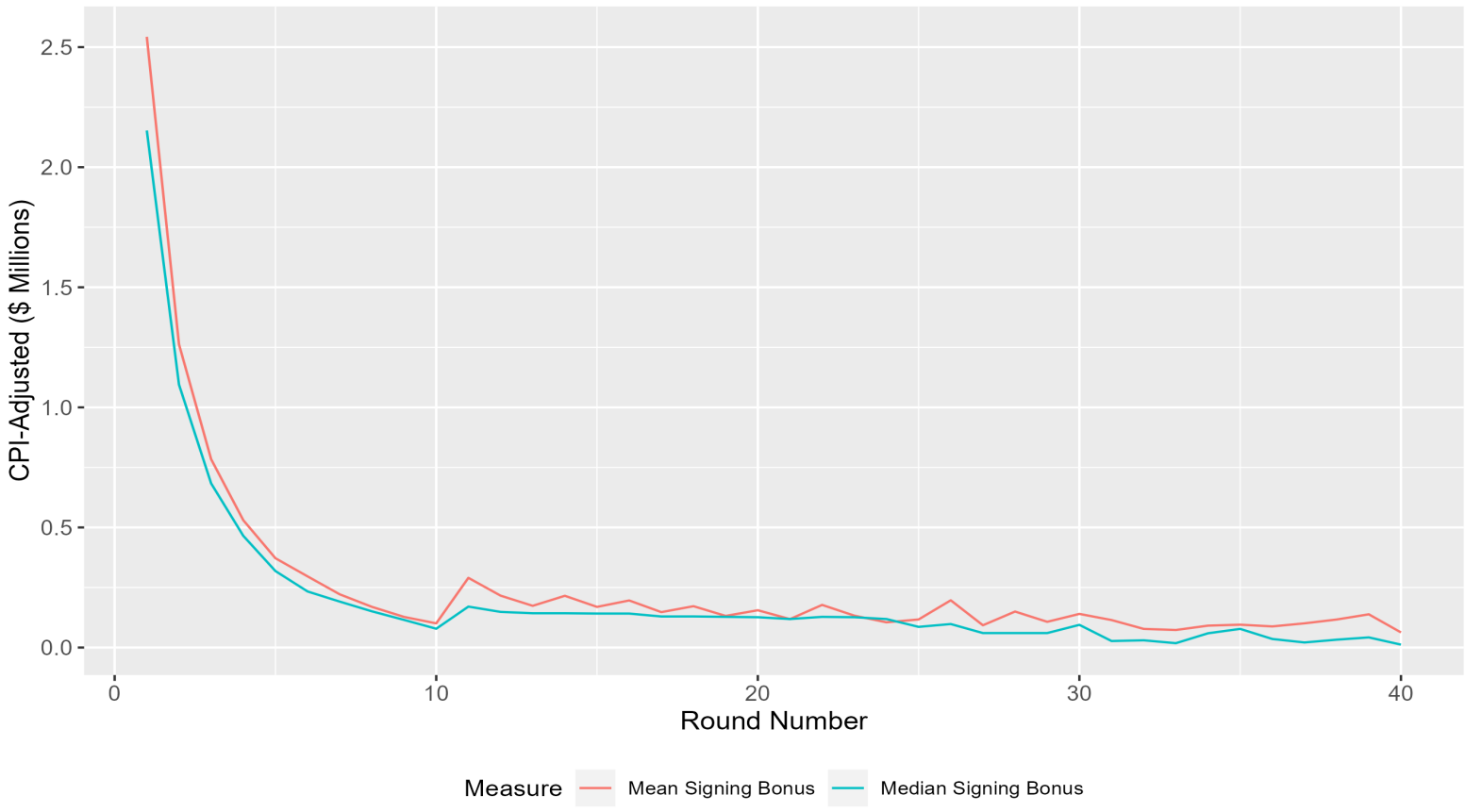
MLB Draft Signing Bonus by Round



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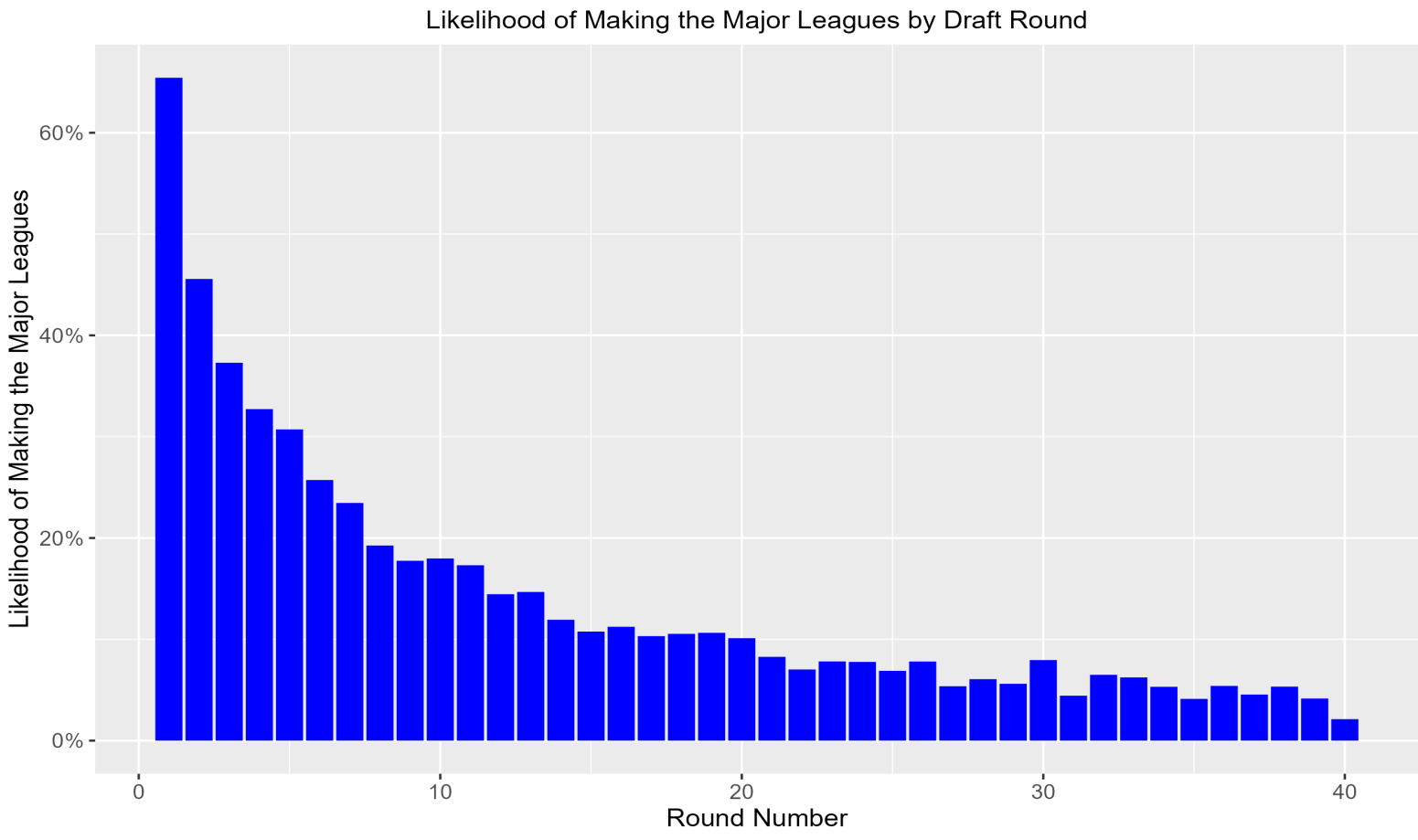
MLB Likelihood by Draft Round



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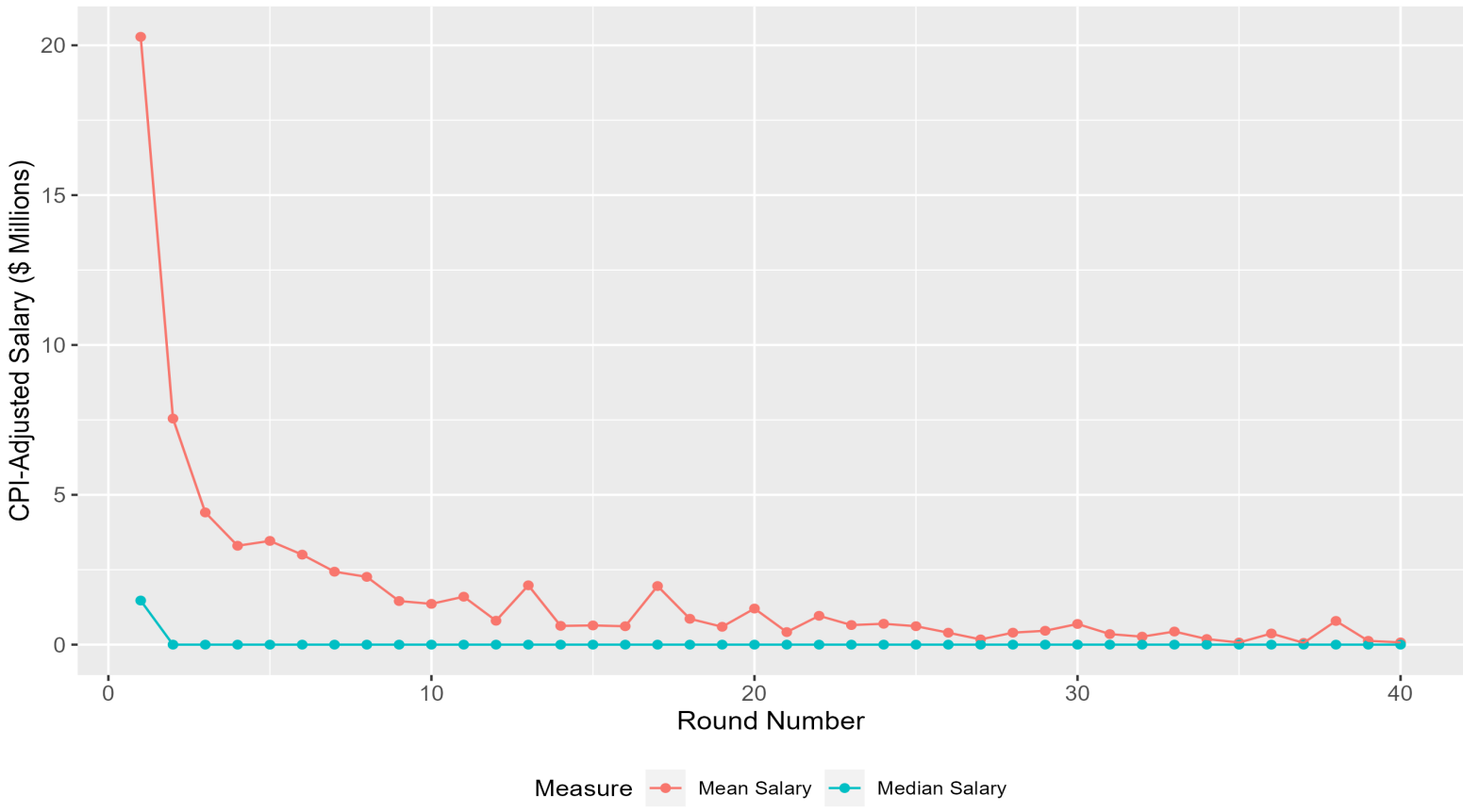
Expected Career Earnings by Draft Round



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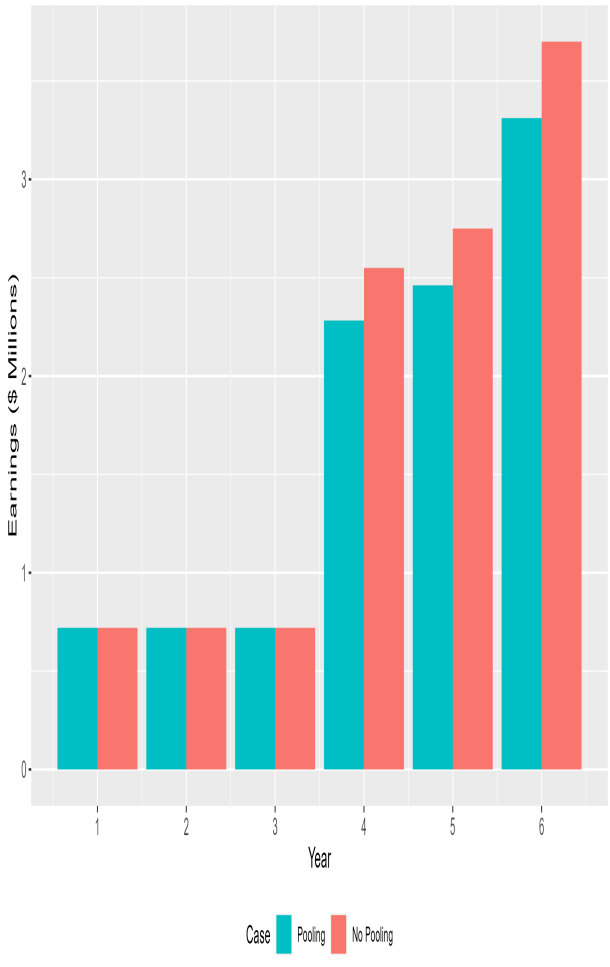
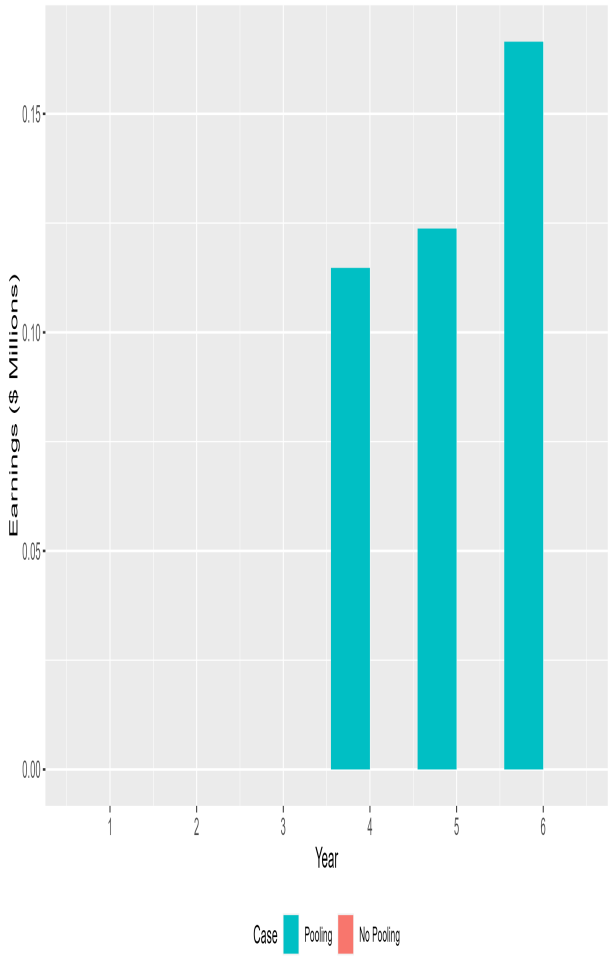
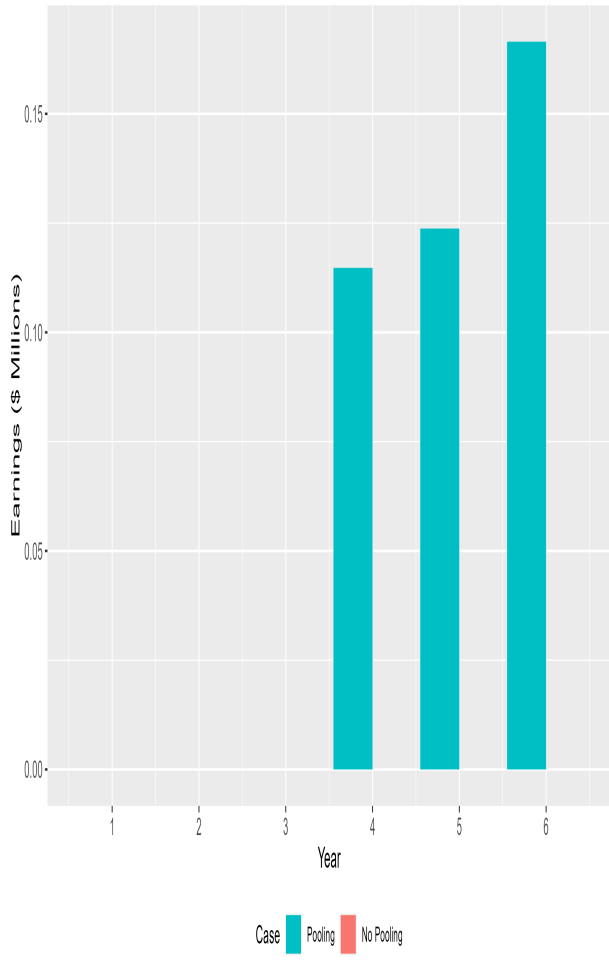
Pooling Process Example







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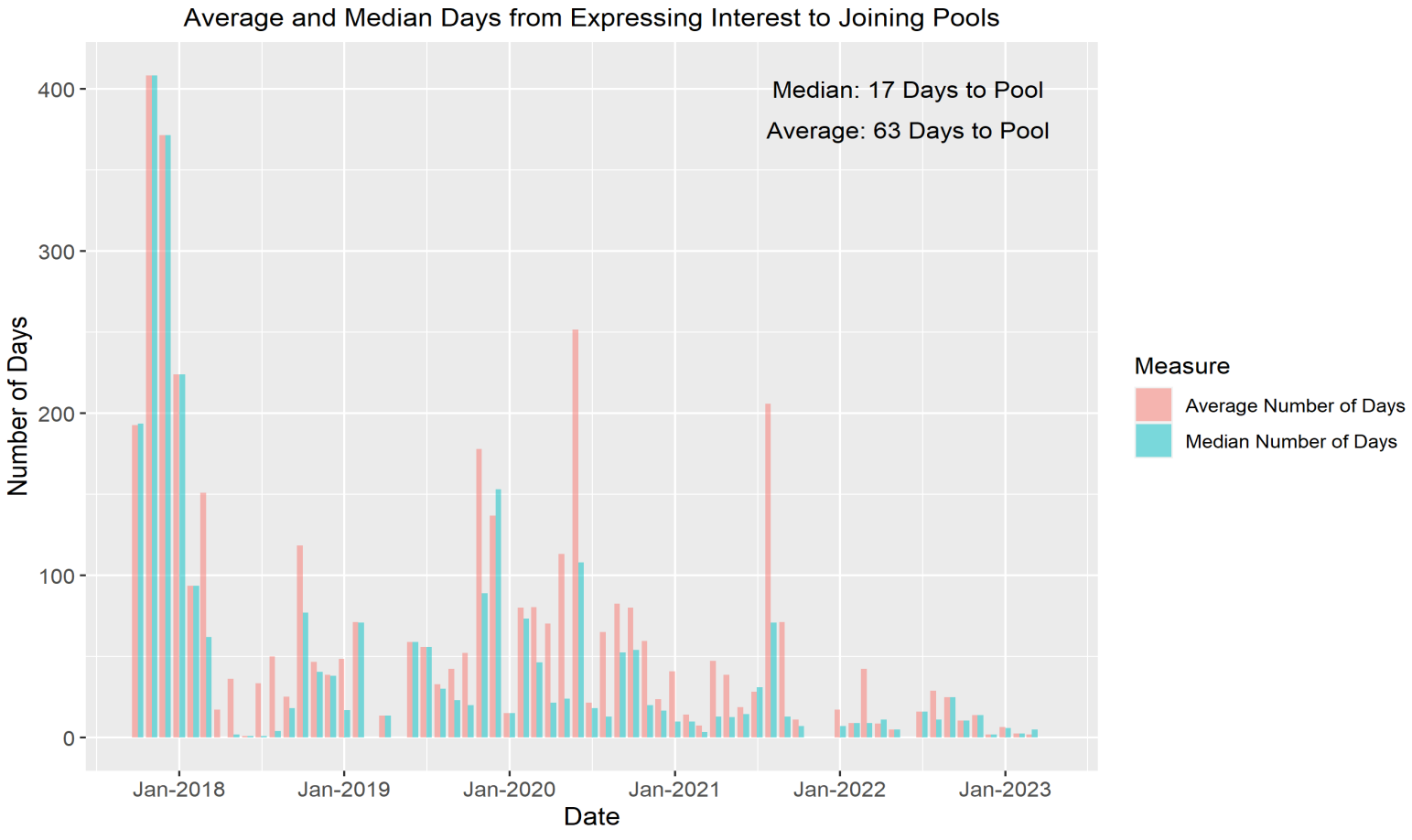
Time from Platforming to Pooling



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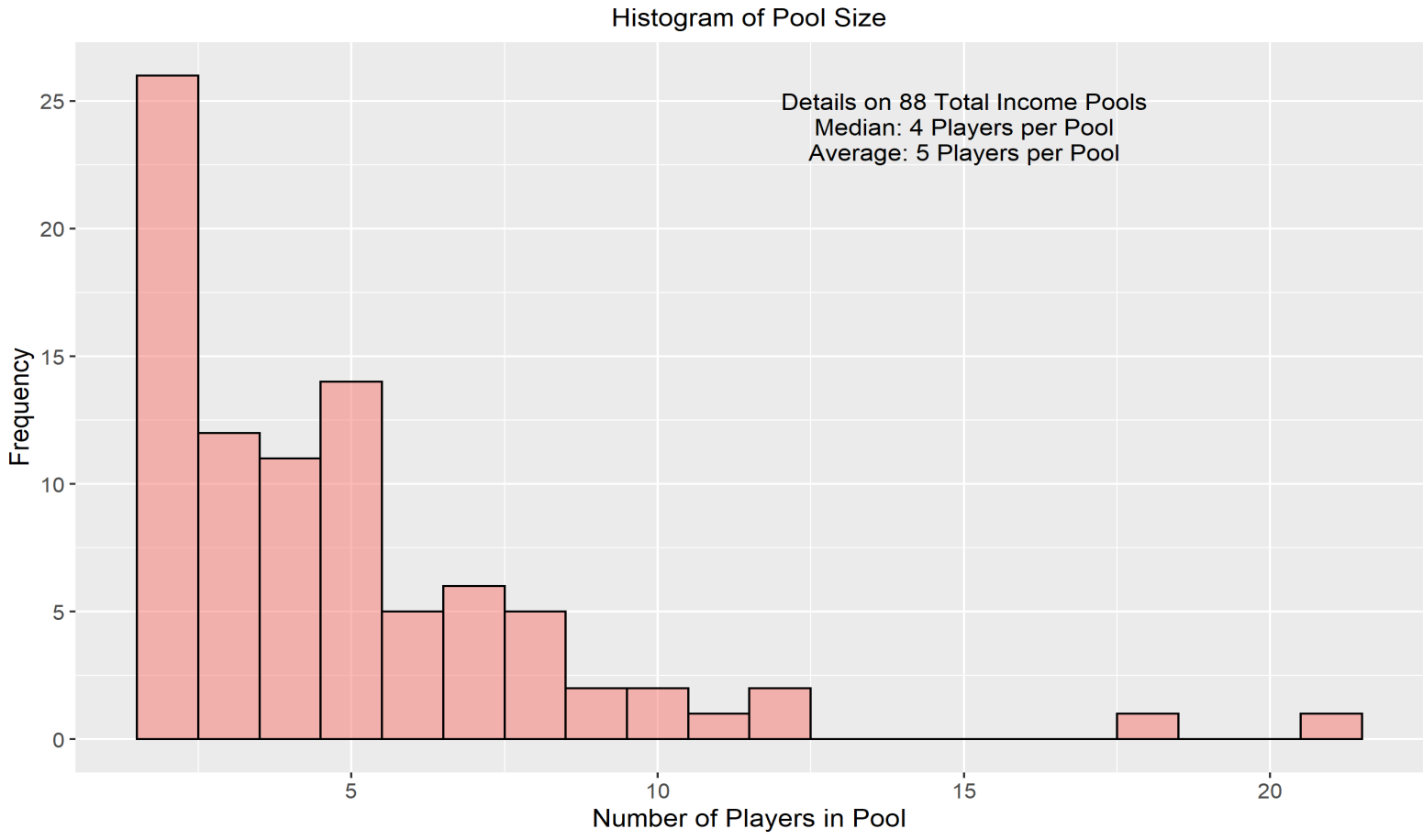
Income Pool Size Distribution



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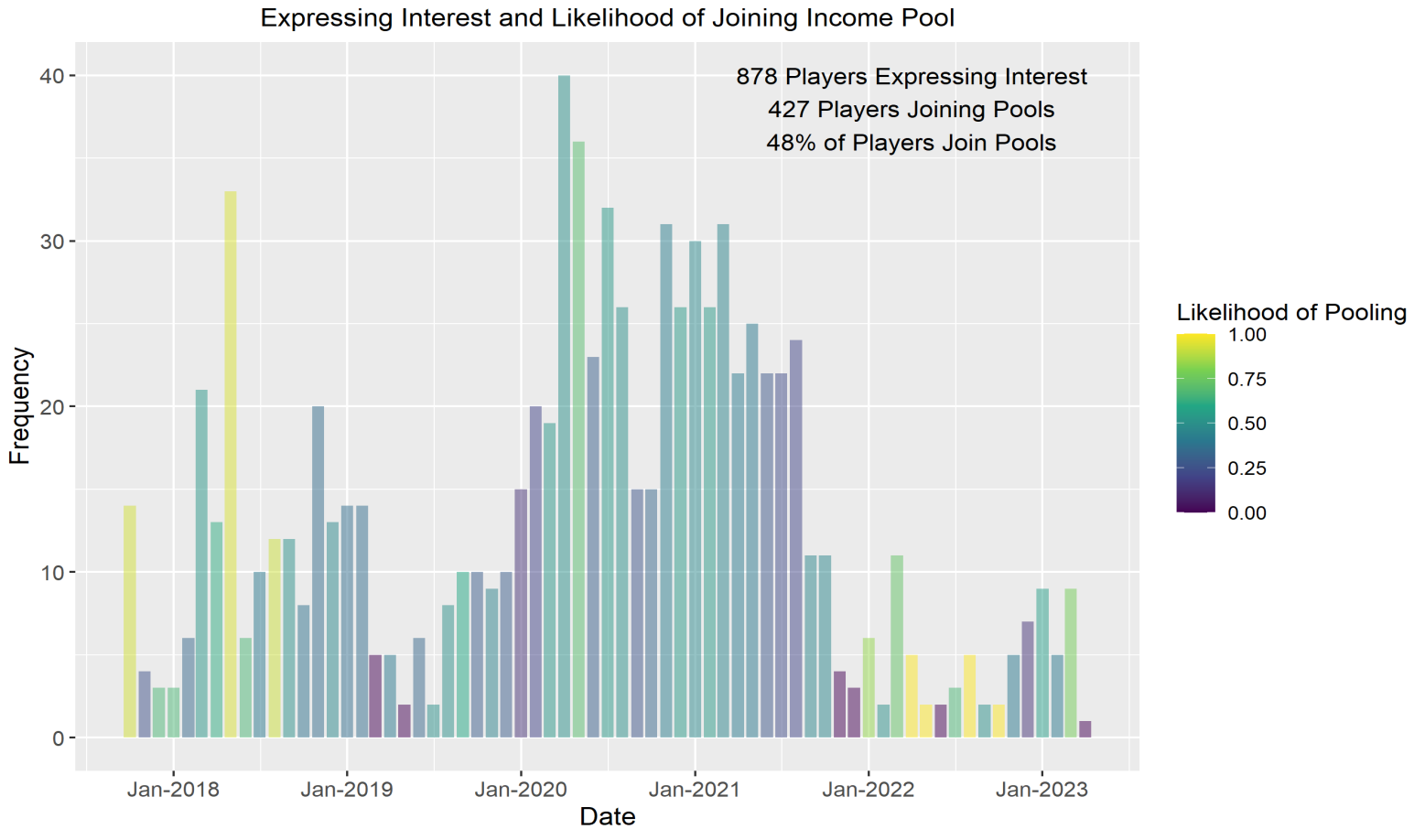
Platforming to Pooling Conversion Rate



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Selection Differences Platforming

Sample	Platform?			Pool?		
	All	Hitters	Pitchers	All	Hitters	Pitchers
	(1)	(2)	(3)	(4)	(5)	(6)
Round Number	0.04	0.10*	0.06	0.05**	0.09**	0.04*
	[0.03]	[0.05]	[0.04]	[0.02]	[0.04]	[0.02]
Bonus	-0.12***	-0.18***	-0.16***	-0.05***	-0.06**	-0.08***
	[0.03]	[0.05]	[0.04]	[0.01]	[0.02]	[0.01]
Drafted College	2.53**	-0.37	1.93	1.10*	0.50	0.95
	[0.96]	[2.44]	[1.08]	[0.59]	[1.58]	[0.78]
Pitcher	-0.50***			-0.24		
	[0.14]			[0.21]		
Average OPS		14.23***			7.22**	
		[3.51]			[2.92]	
Average PA		0.07*			0.02	
		[0.03]			[0.02]	
Average ERA			-0.35**			-0.25**
			[0.14]			[0.08]
Average IP			0.37***			0.19***
			[0.09]			[0.06]
Observations	18929	8563	10351	18929	8563	10351
R^2	0.05	0.09	0.06	0.04	0.05	0.05
Affiliation F.E.	Yes	Yes	Yes	Yes	Yes	Yes
First Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Y-Mean	4.54	4.81	4.31	2.23	2.36	2.14
Y-SD	20.81	21.40	20.31	14.78	15.18	14.46

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Selection Differences Pooling

Sample	Platform?			Pool?		
	All	Hitters	Pitchers	All	Hitters	Pitchers
	(1)	(2)	(3)	(4)	(5)	(6)
Round Number	0.04	0.10*	0.06	0.05**	0.09**	0.04*
	[0.03]	[0.05]	[0.04]	[0.02]	[0.04]	[0.02]
Bonus	-0.12***	-0.18***	-0.16***	-0.05***	-0.06**	-0.08***
	[0.03]	[0.05]	[0.04]	[0.01]	[0.02]	[0.01]
Drafted College	2.53**	-0.37	1.93	1.10*	0.50	0.95
	[0.96]	[2.44]	[1.08]	[0.59]	[1.58]	[0.78]
Pitcher	-0.50***			-0.24		
	[0.14]			[0.21]		
Average OPS		14.23***			7.22**	
		[3.51]			[2.92]	
Average PA		0.07*			0.02	
		[0.03]			[0.02]	
Average ERA			-0.35**			-0.25**
			[0.14]			[0.08]
Average IP			0.37***			0.19***
			[0.09]			[0.06]
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R^2	0.05	0.09	0.06	0.04	0.05	0.05
Affiliation F.E.	Yes	Yes	Yes	Yes	Yes	Yes
First Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Y-Mean	4.54	4.81	4.31	2.23	2.36	2.14
Y-SD	20.81	21.40	20.31	14.78	15.18	14.46

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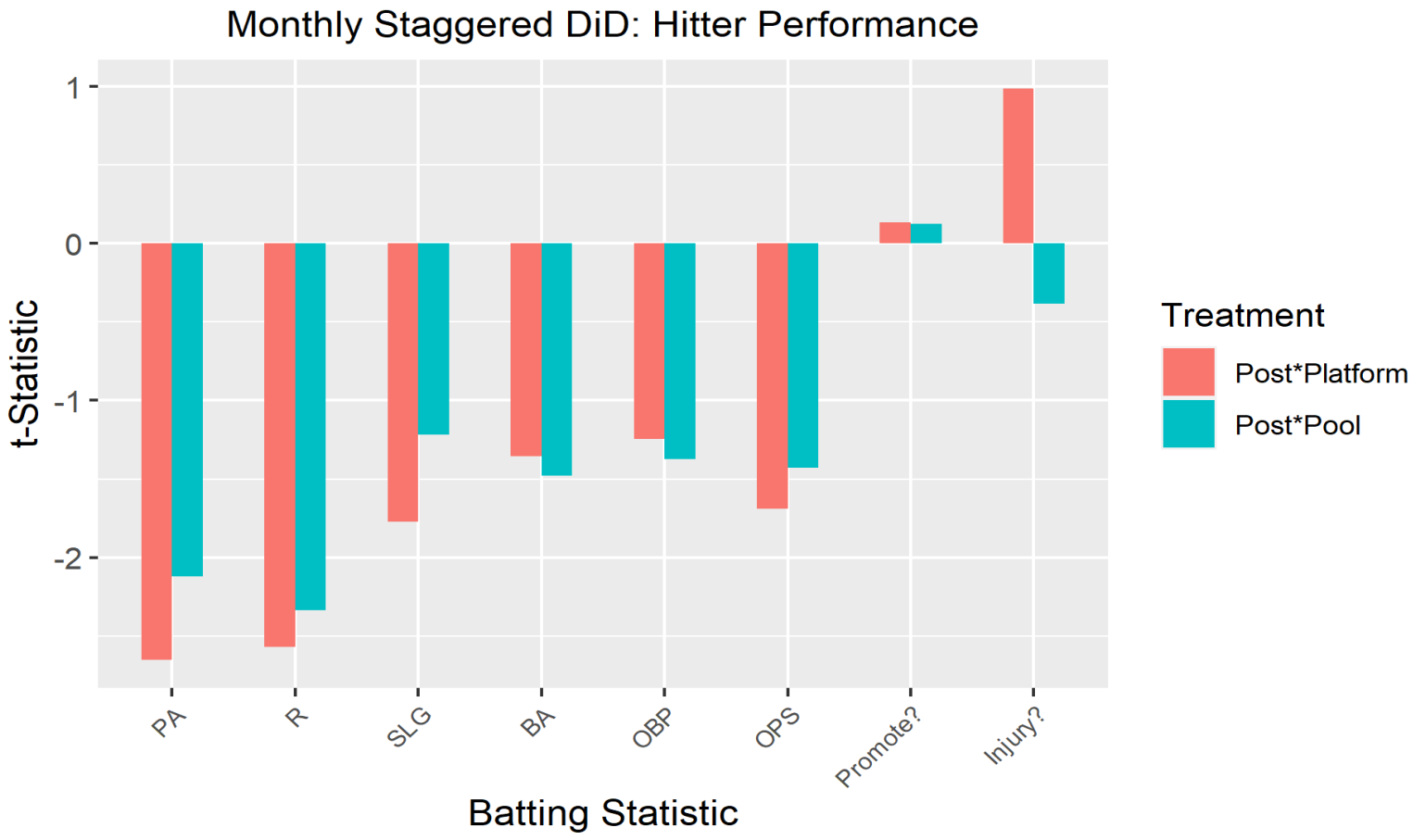
Hitter Performance T-Statistics



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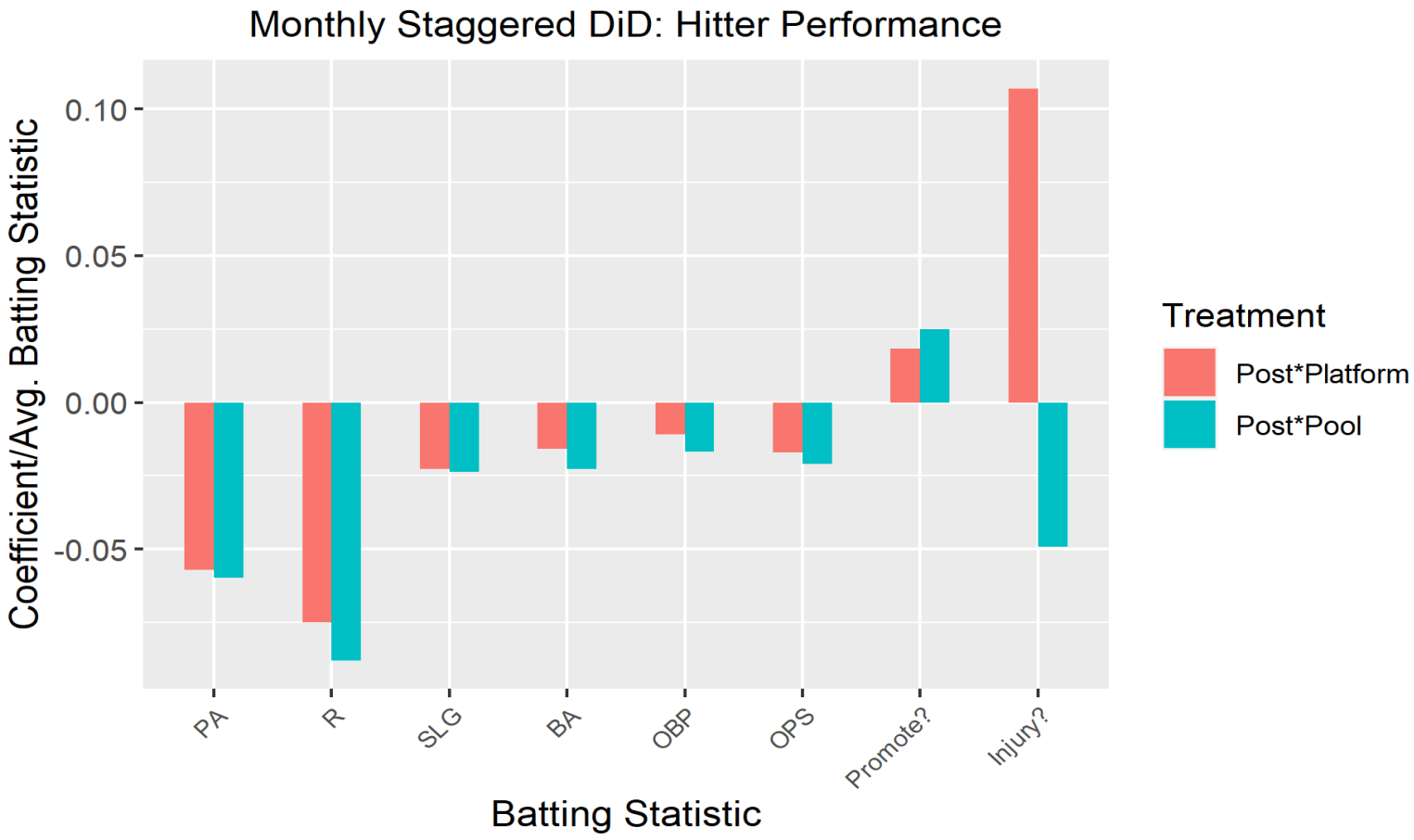
Hitter Performance T-Statistics



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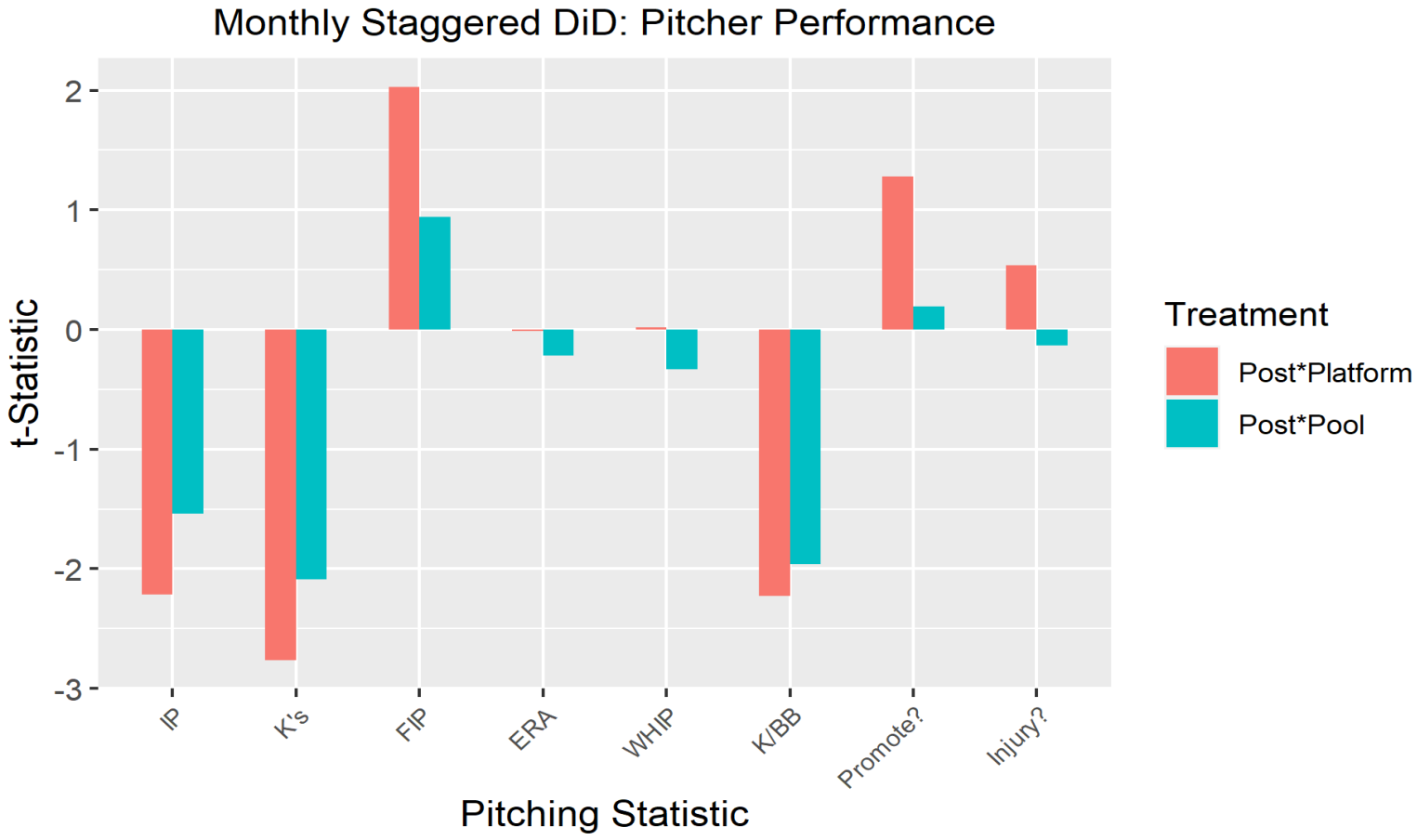
Pitcher Performance T-Statistics



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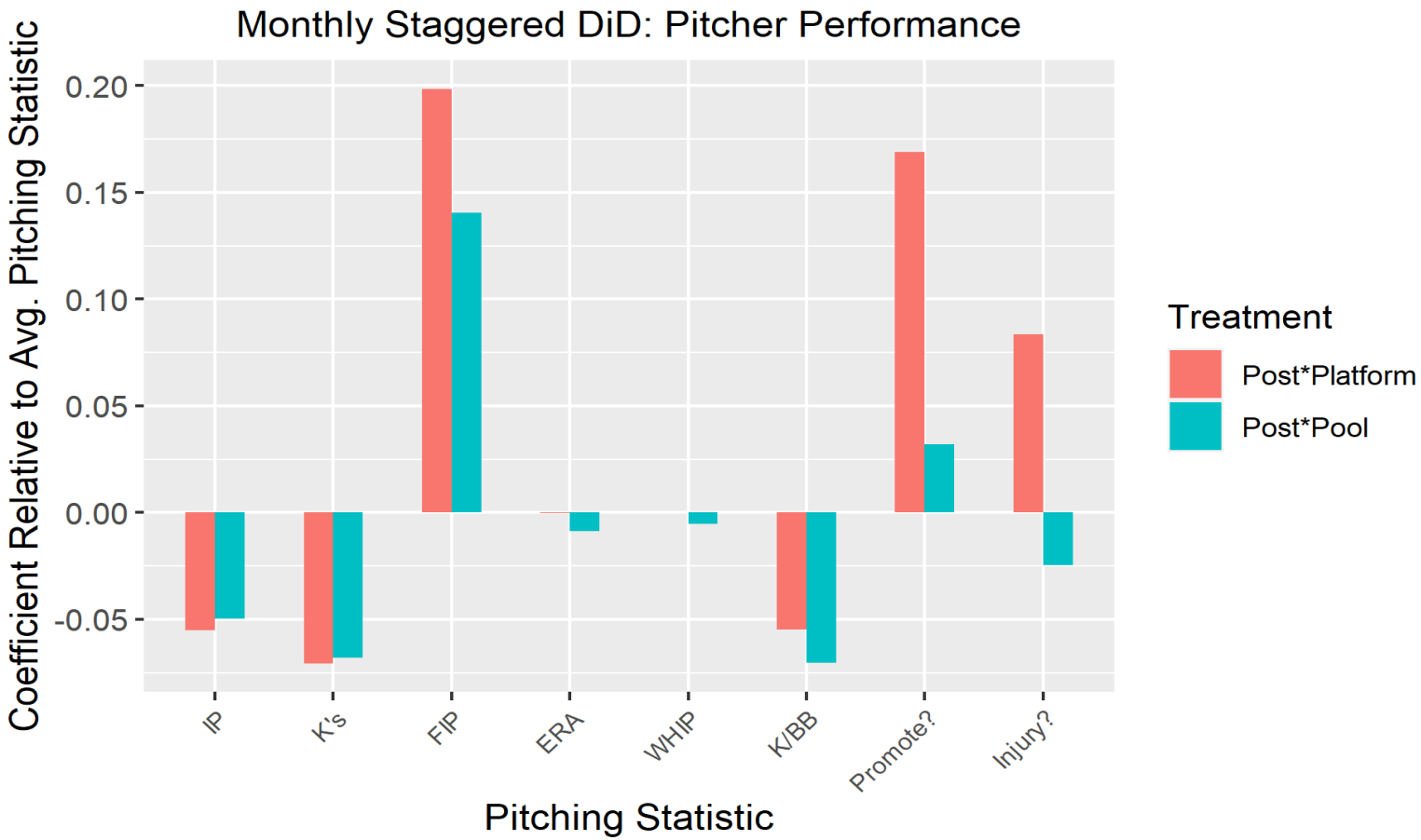
Pitcher Performance T-Statistics



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Platforming Timing Adoption

	Platform?							
	Hitters				Pitchers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PA_{t-1}	-0.00**							
	[0.00]							
On-Base % Plus $Slugging_{t-1}$		-0.21						
		[0.22]						
$Promotion_{t-1}$			0.03				0.18	
			[0.16]				[0.13]	
$Injury_{t-1}$				0.11				0.36***
				[0.13]				[0.13]
Inning $Pitched_{t-1}$					-0.01			
					[0.01]			
ERA_{t-1}						0.01		
						[0.01]		
Observations	109384	109243	109391	109391	115733	115610	115943	115943
R^2	0.63	0.63	0.63	0.63	0.65	0.65	0.65	0.65
Fixed Effects F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Y-Mean	2.32	2.32	2.32	2.32	2.25	2.25	2.25	2.25
Y-SD	15.05	15.05	15.05	15.05	14.83	14.83	14.84	14.84
X1-Mean	61.17	0.68	0.08	0.05	12.46	4.17	0.09	0.05
X1-SD	33.59	0.19	0.27	0.22	7.52	3.09	0.29	0.21

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Instrument Relevance?

	Post Platform?				Post Pool?			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Platform Location Instrument$_{t-1}$	1.14***	1.21***			0.56***	0.59***		
	[0.15]	[0.16]			[0.09]	[0.10]		
US Origin$_i$ $\times$ Platform Location Instrument$_{t-1}$		-0.26*				-0.13		
		[0.15]				[0.09]		
Platform Affiliation Instrument$_{t-1}$			0.73***	1.15***			0.57***	0.81***
			[0.19]	[0.22]			[0.12]	[0.15]
US Origin$_i$ $\times$ Platform Affiliation Instrument$_{t-1}$				-0.78***				-0.46***
				[0.14]				[0.11]
Observations	247327	247208	247327	247208	247327	247208	247327	247208
R^2	0.61	0.62	0.61	0.61	0.60	0.60	0.59	0.59
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Y-Mean	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Y-SD	0.14	0.14	0.14	0.14	0.10	0.10	0.10	0.10
Instrument Mean	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Instrument SD	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
F-Statistic	57.53		14.44		39.33		22.65	

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IV Mechanism

	Excess Affiliation Percent (Max Aff. % - Naive Aff. %)	
	Placebo	Real
	(1)	(2)
Platform Location Instrument	0.12	
	[0.41]	
Platform Affiliation Instrument		1.54**
		[0.73]
Observations	406	406
R^2	0.35	0.36
Month × Year F.E.	Yes	Yes
Location F.E.	Yes	Yes
Y-Mean	0.27	0.27
Y-SD	0.30	0.30

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- Players induced to pool by exposure to their teammates' platforming decisions are significantly more likely to pool with their Major League Affiliate teammates