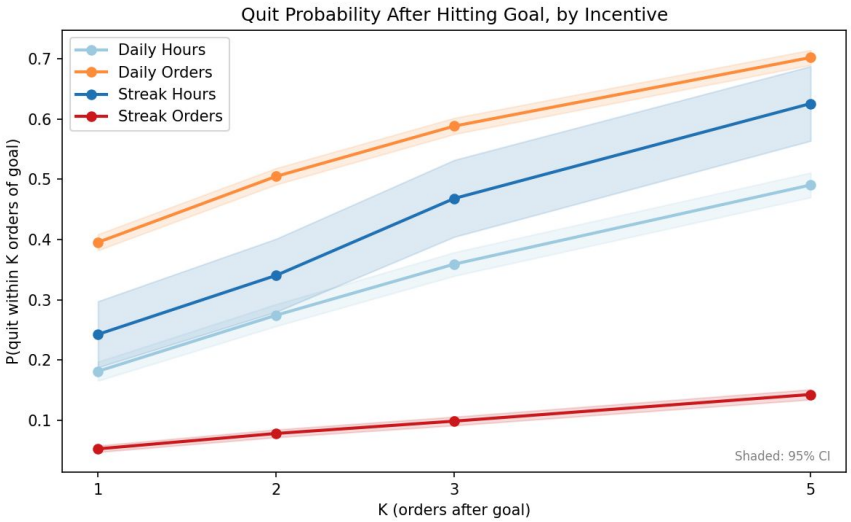
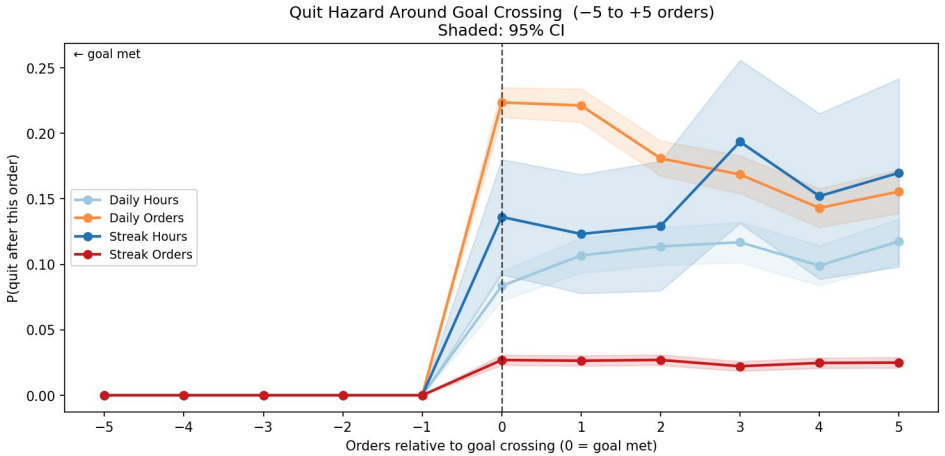
Top Insights

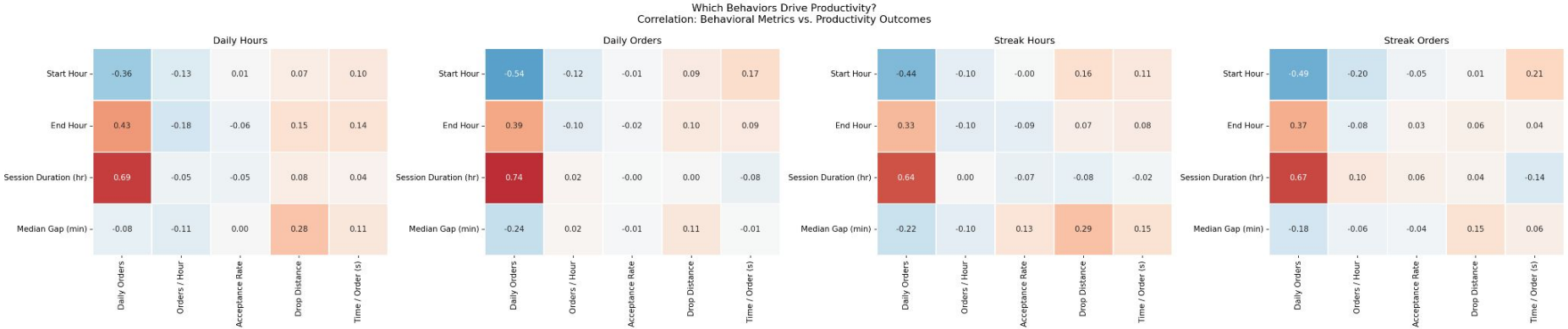
Daily Orders causes sharp stop at/after goal behavior





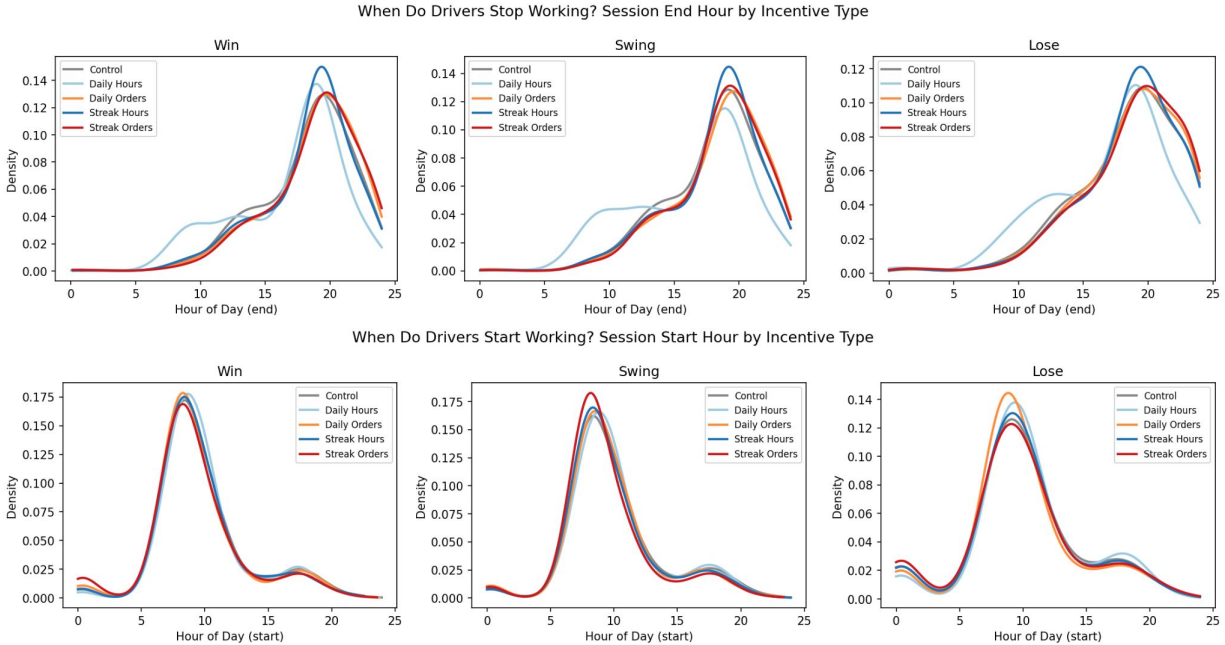
After hitting their goal, 58.8% of DO drivers quit within 3 orders. DO creates the sharpest behavioral stop of any incentive type. More than 1 in 5 DO drivers quit on the exact order they hit their daily target, and 70% are gone within 5 orders.

Duration worked is what drives productivity



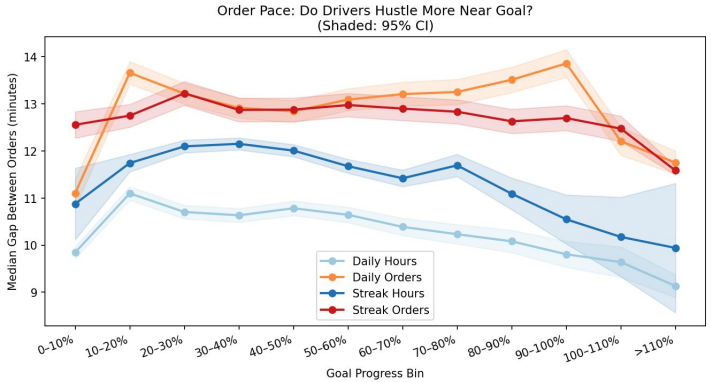
Across all incentive types, the behavior that has the most impact on productivity metrics is session duration which is positively correlated with daily orders, most other metrics aren't correlated to driver behaviors. By increasing the hours the drivers work, daily orders will likely increase as well. (continued in next slide)

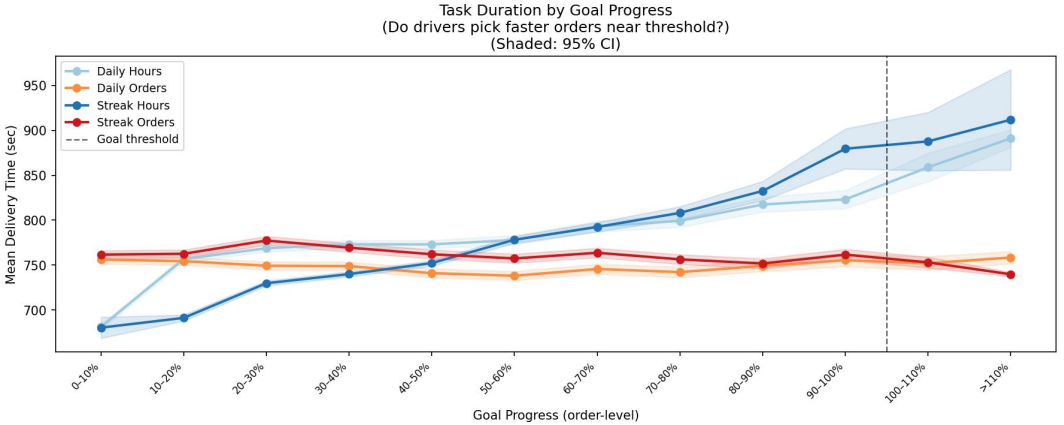
Duration worked is what drives productivity (cont.)



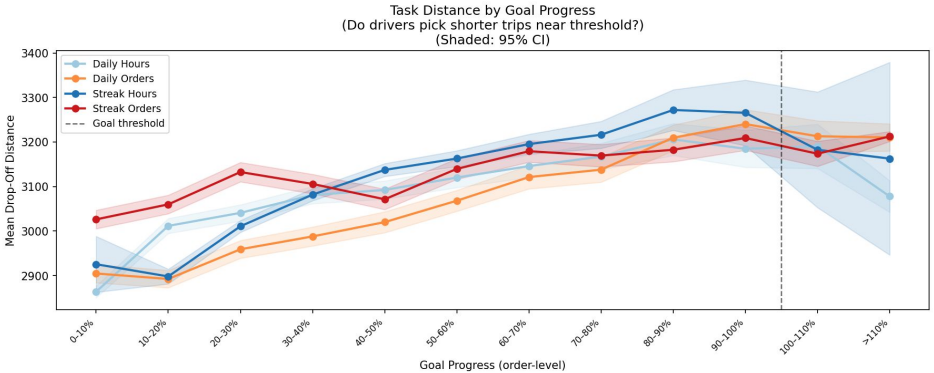
Driver start times don’t change across market regimes and incentives. End hours is the main change that results in different session durations so to increase productivity we should aim to increase session duration.

Order based incentives have higher productivity

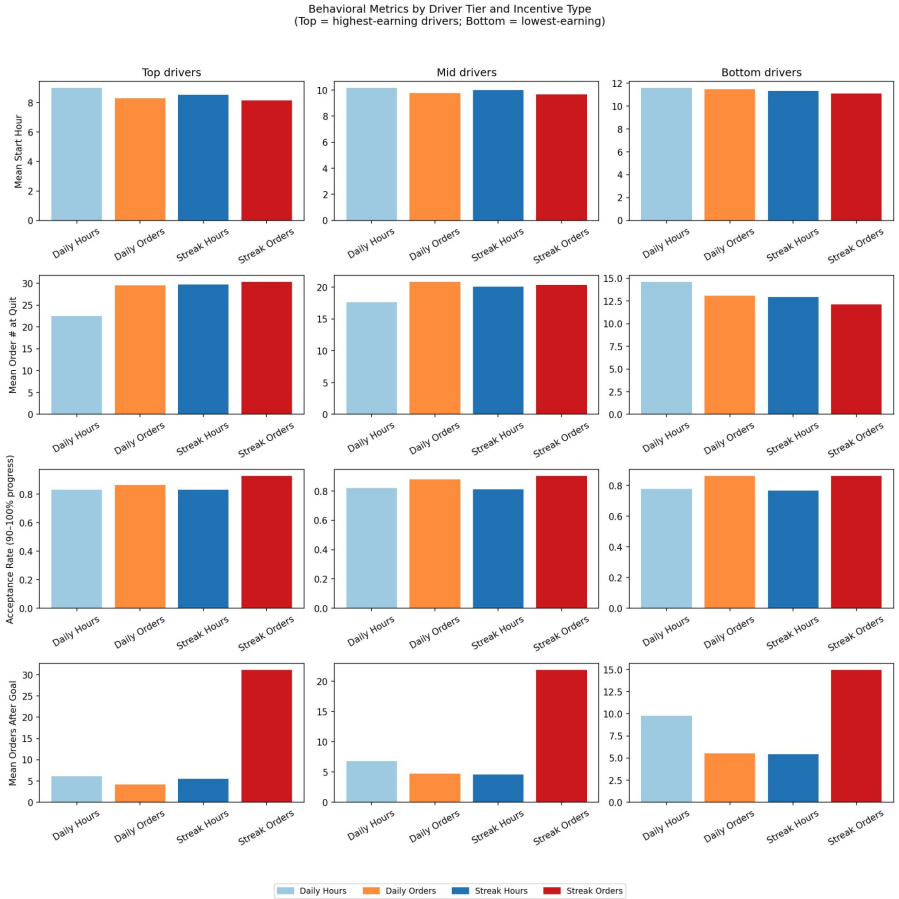




Orders based incentives have slightly longer gaps between orders but consistently low delivery time while hours based incentives have shorter time between orders and increasing delivery times throughout the day. Distance is approximately the same for all incentives.



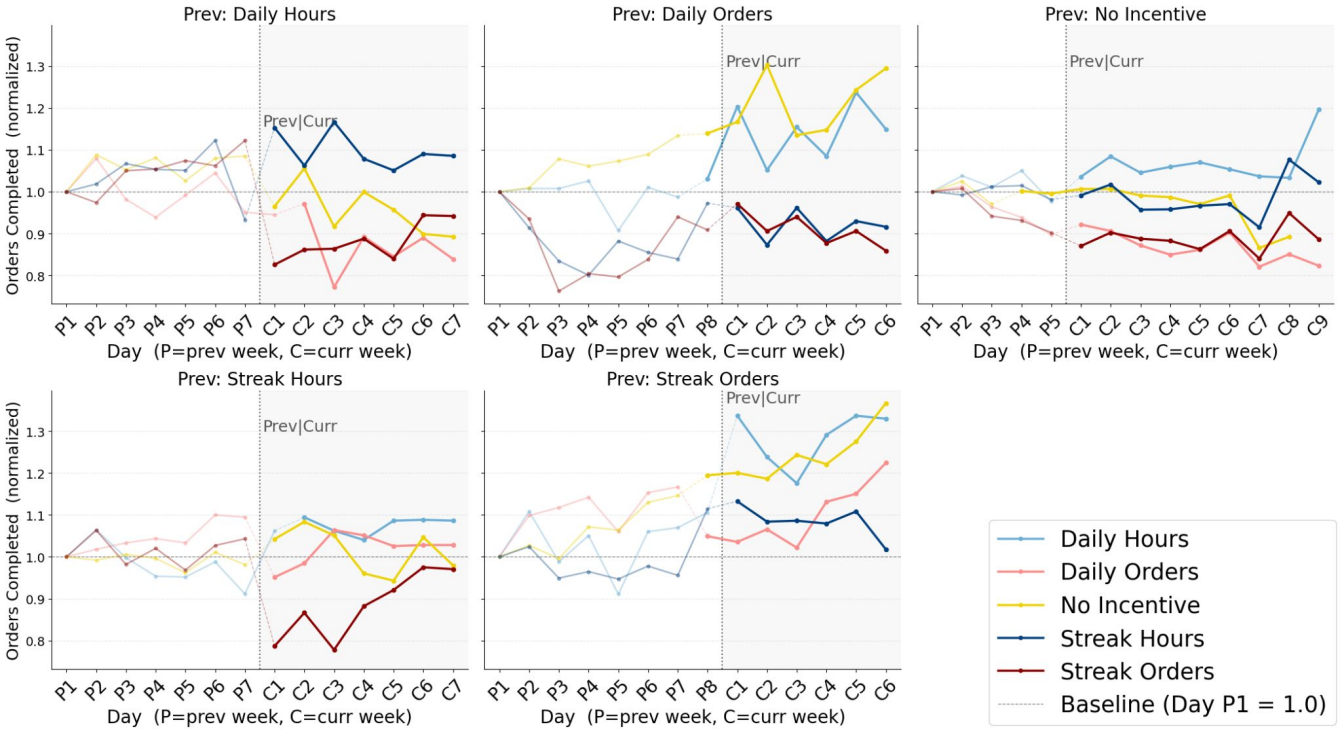
DH reduces productivity for higher tier drivers



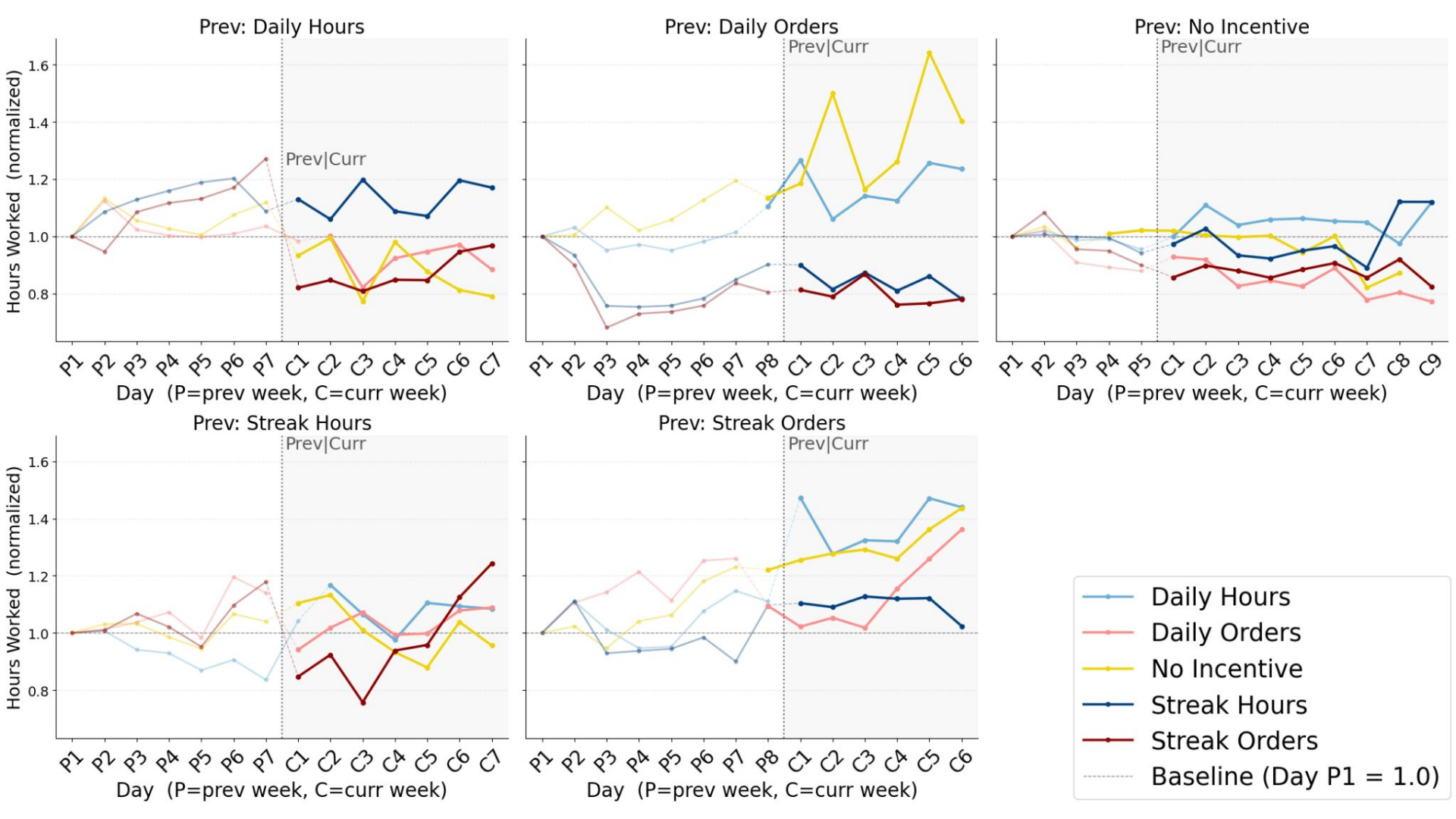
In the Mean Order # at Quit row for top drivers, the DH bar is shorter than the other three incentives, ~22 vs. ~30 for DO, SH, and SO. This gap is less significant in mid tier drivers and does not appear for bottom tier drivers. The hours-based daily incentive disproportionately pulls high-earning drivers to stop earlier than they otherwise would.

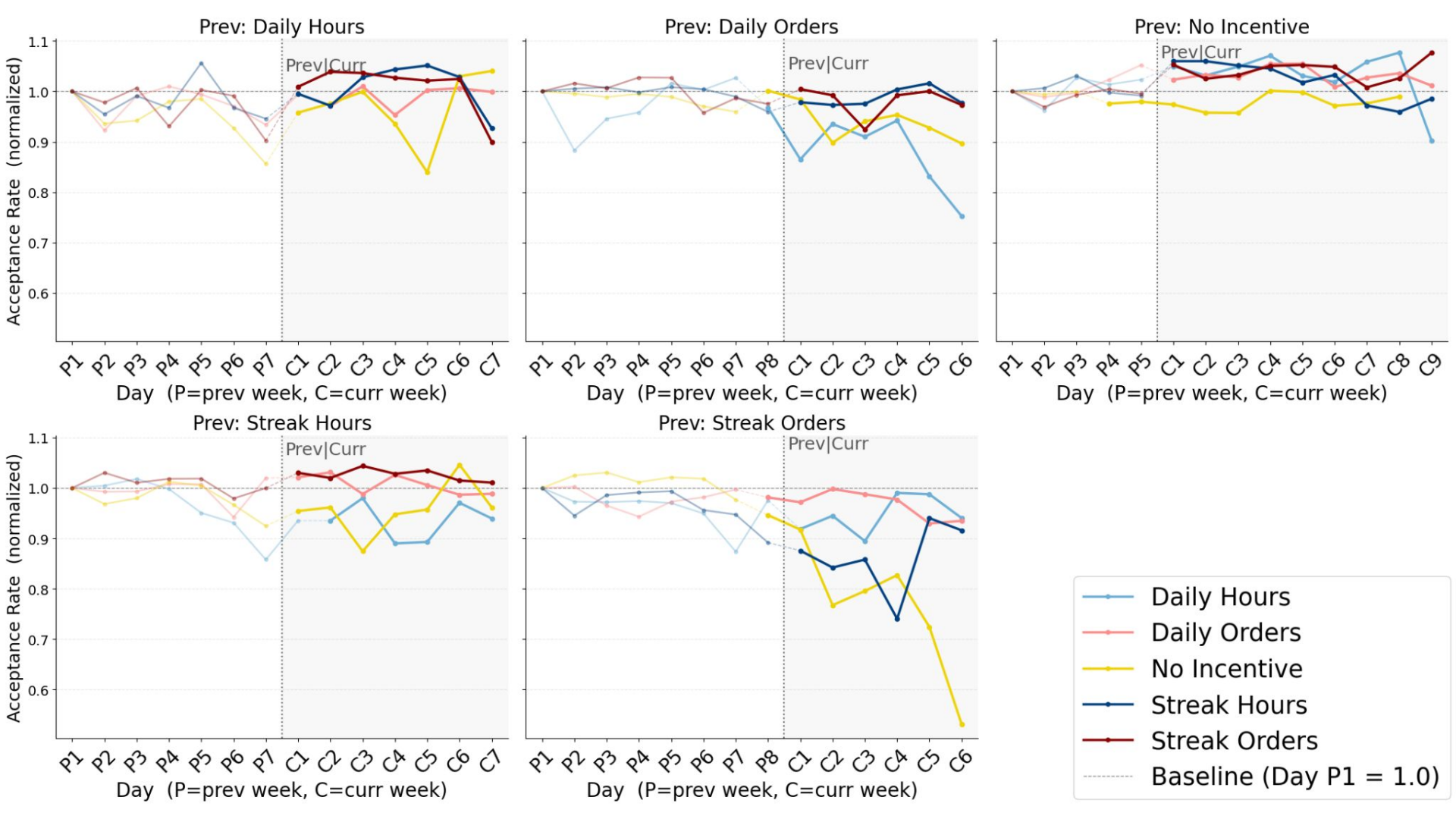
1. Novelty Effect: There is a Day 1 peak, followed by a drop after the first day, and then an increase again near the end of the week (Mixed-effect model)
    a. End of the week growth could be due to a lot of the incentives having Hunting Periods/required days on weekends/end of the week (especially Streak-based incentives)
        i. There is a stronger end of week “recovery” for streak-based incentives
    b. Especially in hours worked
2. Streak based incentives are less likely to have as big of a “shock” on Day 1 after the introduction of the incentive, and their behavior is more consistent throughout the week (less of a drop after Day 1) (aka they pace themselves better than daily-level incentives)
    a. Could also be the structure of the incentive itself (driver’s are following the structure of the incentive)
        i. E.g daily based goals have a higher goal to reach each day; streak-based incentives kind of have built in pacing (e.g. Mid-level driver in KHONKAEN) Streak orders -> 26 orders for Mon/Tues; 24 orders for Wed/Thu/Fri; 29 orders for Sat/Sun VS Daily Orders -> 27 orders everyday)
3. Streak Orders to No Incentive continues an upwards trend in terms of orders completed and hours worked, but a downward trend in terms of acceptance rate indicating a slight carryover effect from a streak-based incentive to the next week, as well as higher demand for the week of No Incentive (Sequencing graphs)
4. Transitioning to No Incentive after an active incentive tends to produce stronger performance than transitioning from one active incentive to another (especially in the beginning of the week) (Welch’s t-test/sequencing graphs)
    a. Carry-over effect from the previou week’s incentive
    b. Drivers would be anticipating the return of the incentive, or there could have been some sort of habit formation
5. Despite different driver tiers, all drivers tend to behave roughly the same (Sequencing graphs split by tiers)

Updated relevant graphs



Daily Hours tends ot have the best/highest productivity in terms of Orders Completed/Hours Worked regardless of the sequencing of incentives but also one of the lowest acceptance rates meaning this increase in productivity could be due to spike in demand

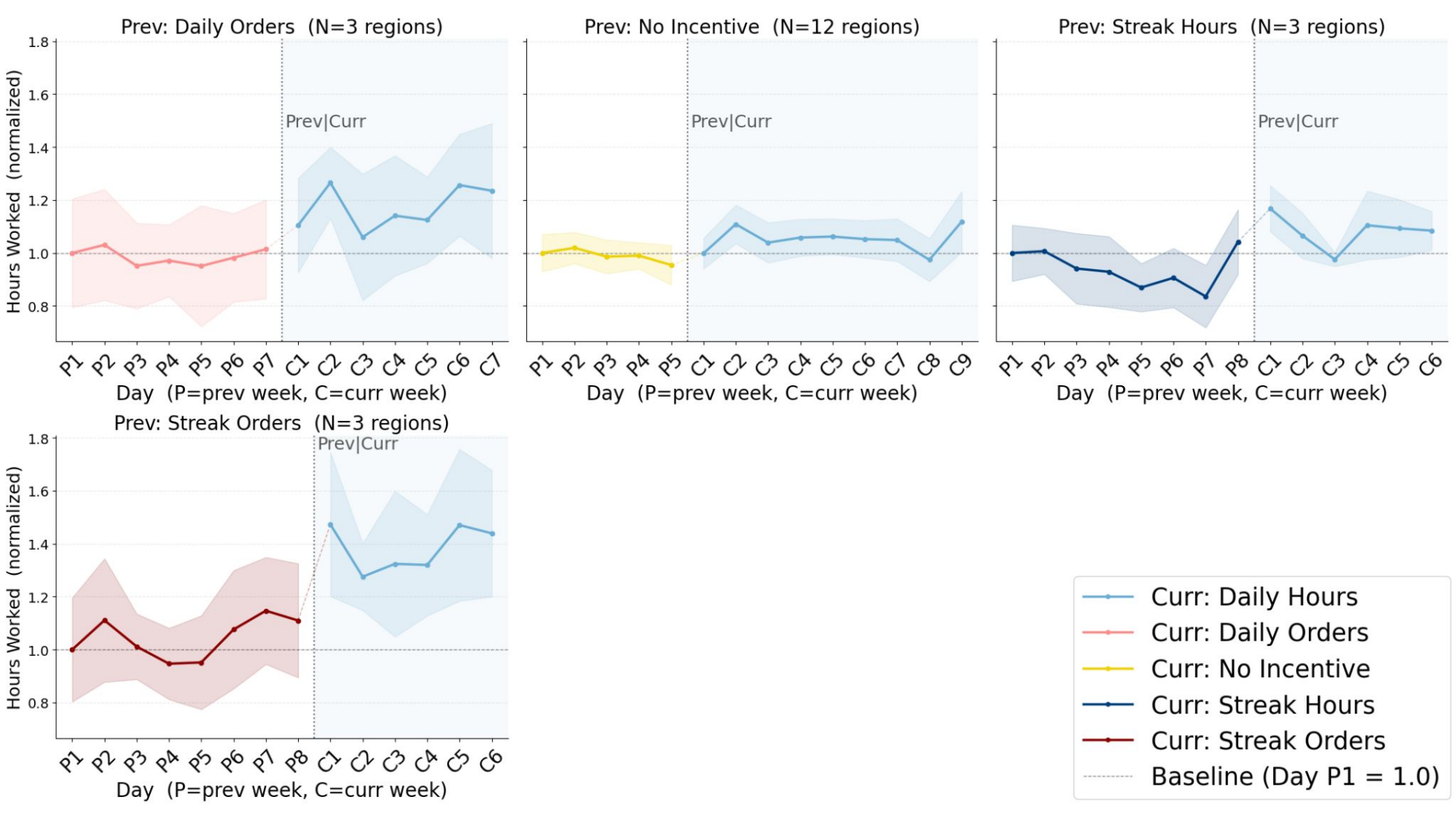

Prev: Daily Hours
Prev: Daily Orders
Prev: No Incentive
Prev: Streak Hours
Prev: Streak Orders
Prev|Curr
Hours Worked (normalized)
Day (P=prev week, C=curr week)
P1 P2 P3 P4 P5 P6 P7 C1 C2 C3 C4 C5 C6 C7
P1 P2 P3 P4 P5 P6 P7 P8 C1 C2 C3 C4 C5 C6
P1 P2 P3 P4 P5 C1 C2 C3 C4 C5 C6 C7 C8 C9
0.8
1.0
1.2
1.4
1.6
Daily Hours
Daily Orders
No Incentive
Streak Hours
Streak Orders
Baseline (Day P1 = 1.0)

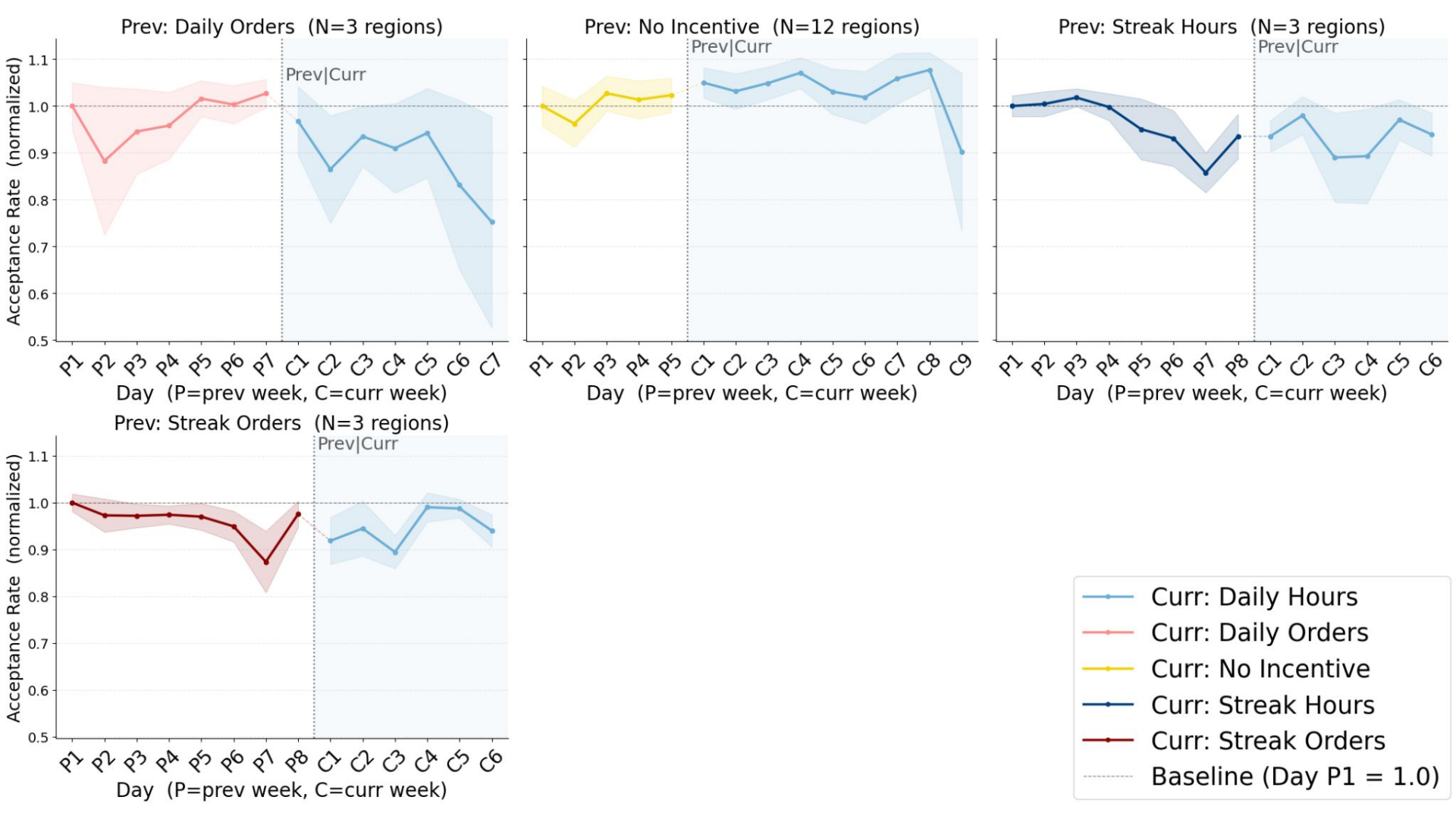

Prev: Daily Hours
Prev: Daily Orders
Prev: No Incentive
Prev: Streak Hours
Prev: Streak Orders
Prev|Curr
Acceptance Rate (normalized)
1.1
1.0
0.9
0.8
0.7
0.6
P1 P2 P3 P4 P5 P6 P7 C1 C2 C3 C4 C5 C6 C7
P1 P2 P3 P4 P5 P6 P7 P8 C1 C2 C3 C4 C5 C6
P1 P2 P3 P4 P5 C1 C2 C3 C4 C5 C6 C7 C8 C9
Day (P=prev week, C=curr week)
Daily Hours
Daily Orders
No Incentive
Streak Hours
Streak Orders
Baseline (Day P1 = 1.0)

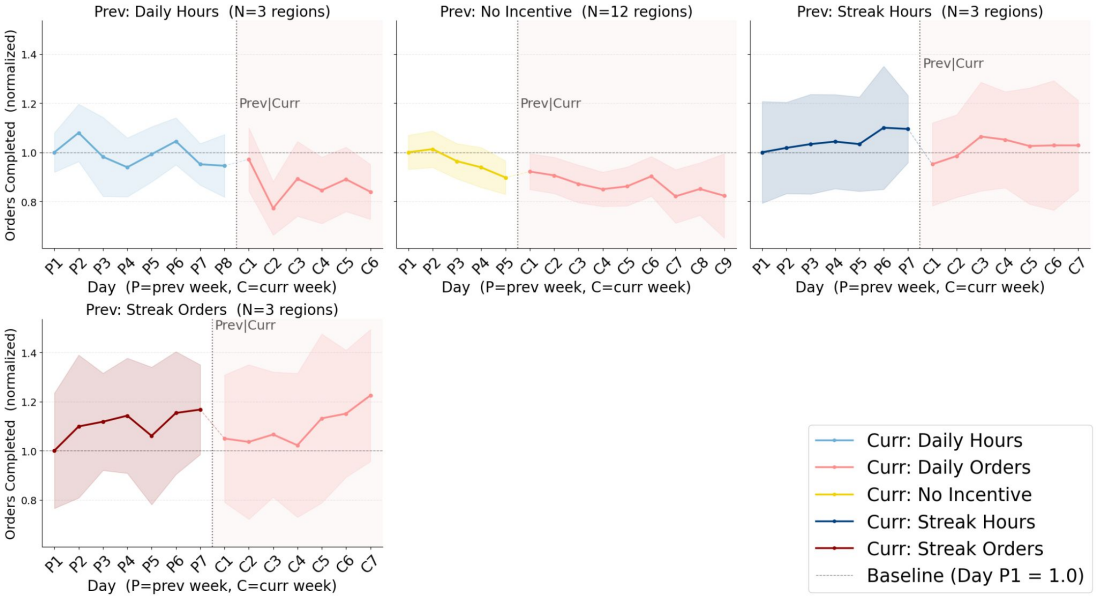
The following graphs are the same as the previous graphs, just easier to read…

- Holding the current week incentive constant, we can see the different behavior as a result of a different previous week's incentive
- Everything is normalized to previous week day 0 to see any changes as a result of incentive sequencing (e.g. does Daily Hours after No incentive do better than Daily Hours after Streak Hours)
- Trend line since all driver tiers tend to behave roughly the same

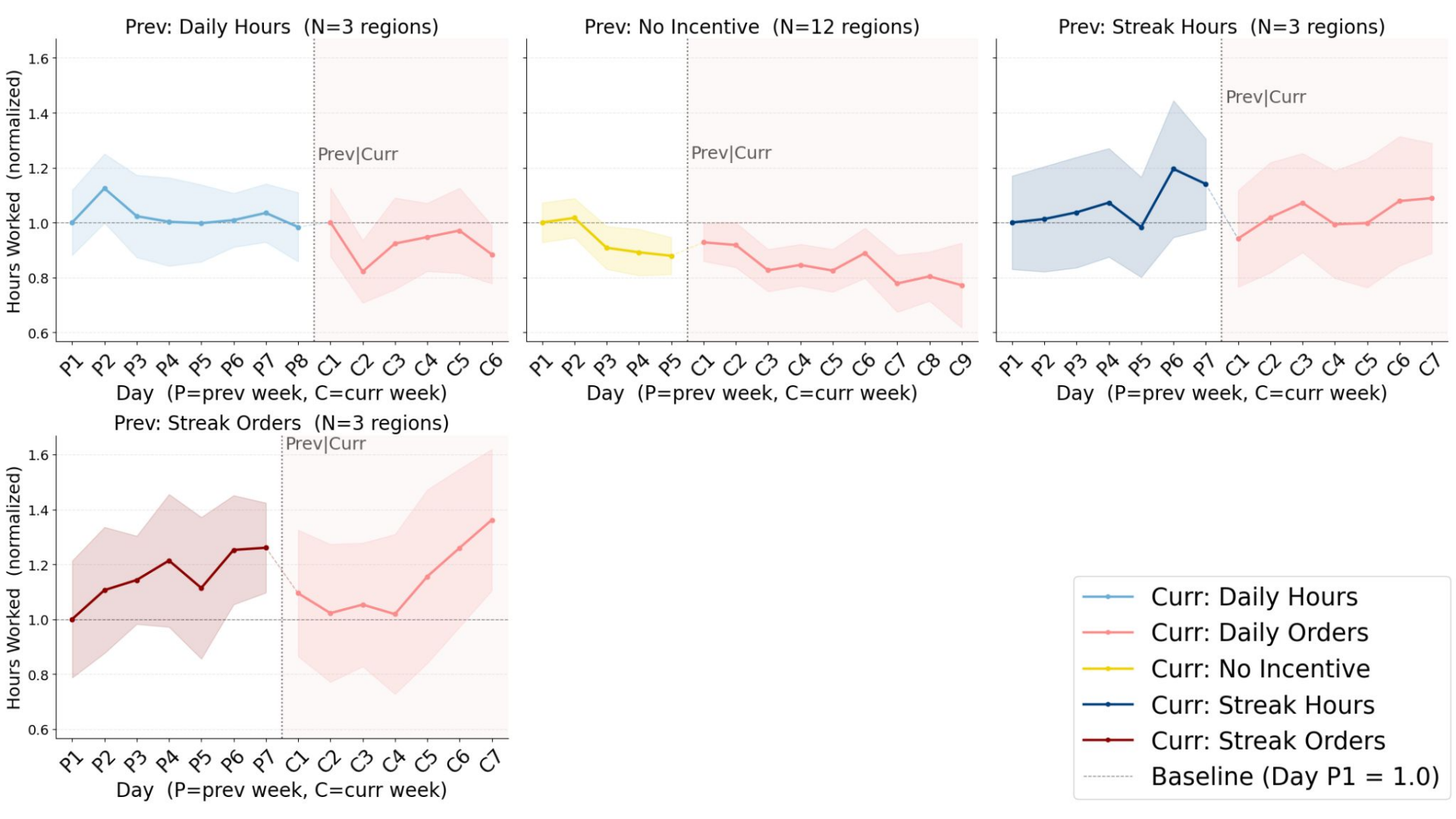
- Streak Orders to Daily Hours does the best in terms of orders and hours worked (increased productivity)
- Acceptance Rate seems to be roughly the same throughout the week
  - Slight dip at the end of the week (likely due to higher demand (aka more orders), and a certain capacity of the drivers to work

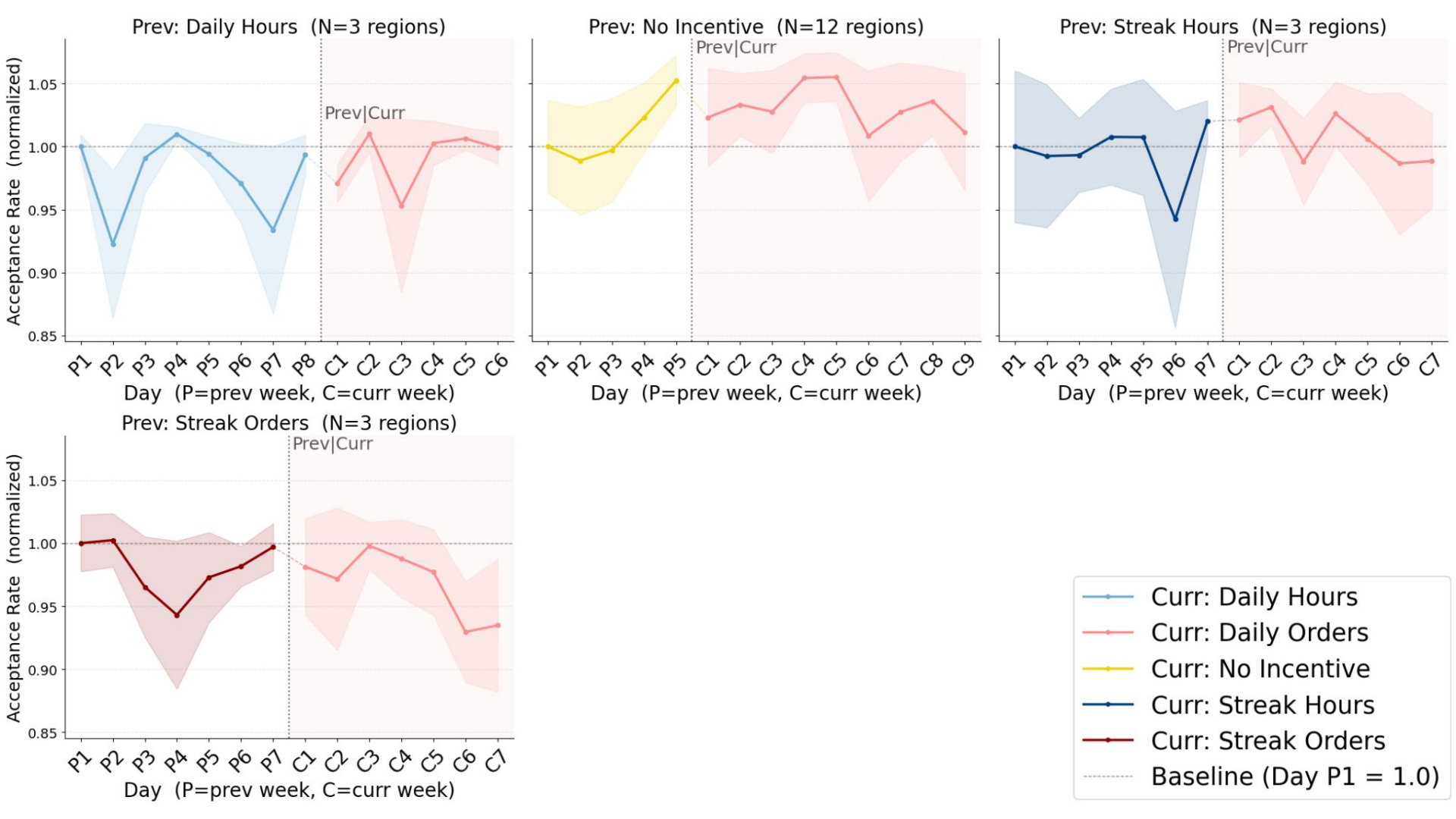

Prev: Daily Orders (N=3 regions)
Prev: No Incentive (N=12 regions)
Prev: Streak Hours (N=3 regions)
Prev: Streak Orders (N=3 regions)
Prev|Curr
Hours Worked (normalized)
1.8
1.6
1.4
1.2
1.0
0.8
P1 P2 P3 P4 P5 P6 P7 C1 C2 C3 C4 C5 C6 C7
P1 P2 P3 P4 P5 C1 C2 C3 C4 C5 C6 C7 C8 C9
P1 P2 P3 P4 P5 P6 P7 P8 C1 C2 C3 C4 C5 C6
Day (P=prev week, C=curr week)
Curr: Daily Hours
Curr: Daily Orders
Curr: No Incentive
Curr: Streak Hours
Curr: Streak Orders
Baseline (Day P1 = 1.0)

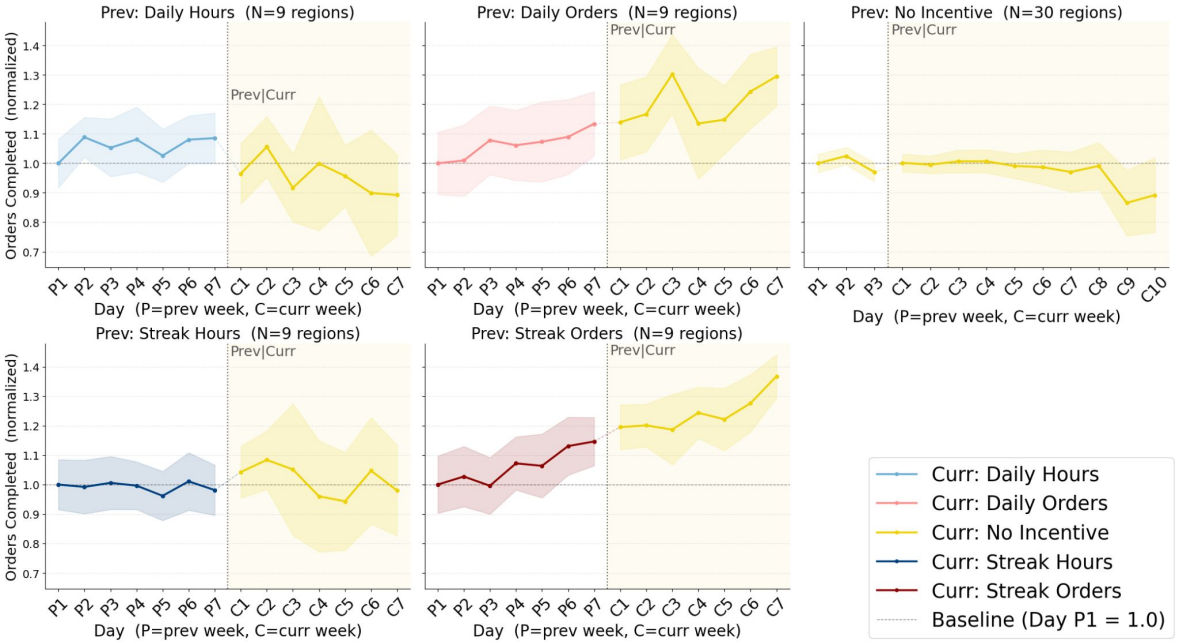

Prev: Daily Orders (N=3 regions)
Prev: No Incentive (N=12 regions)
Prev: Streak Hours (N=3 regions)
Prev: Streak Orders (N=3 regions)
Prev|Curr
Acceptance Rate (normalized)
Day (P=prev week, C=curr week)
Curr: Daily Hours
Curr: Daily Orders
Curr: No Incentive
Curr: Streak Hours
Curr: Streak Orders
Baseline (Day P1 = 1.0)



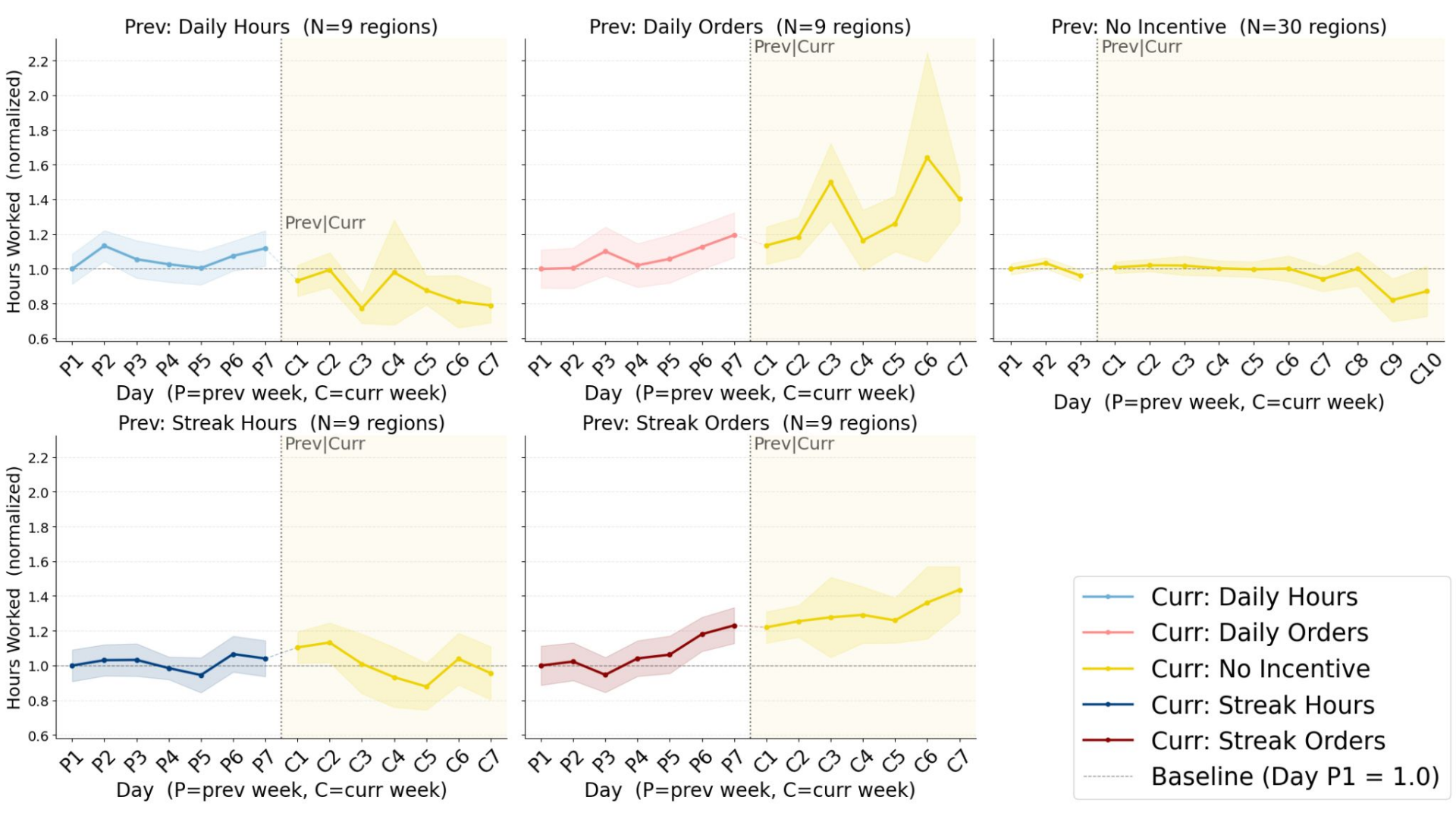
- Previous weeks having streak level incentives (Streak Hours/Streak Orders) tend to carry over the same behavior into the next week when going to a Daily orders incentive compared to coming from Daily Hours of No Incentive
  - Lower acceptance rate for Streak level incentives could also indicate that demand was higher during these time periods

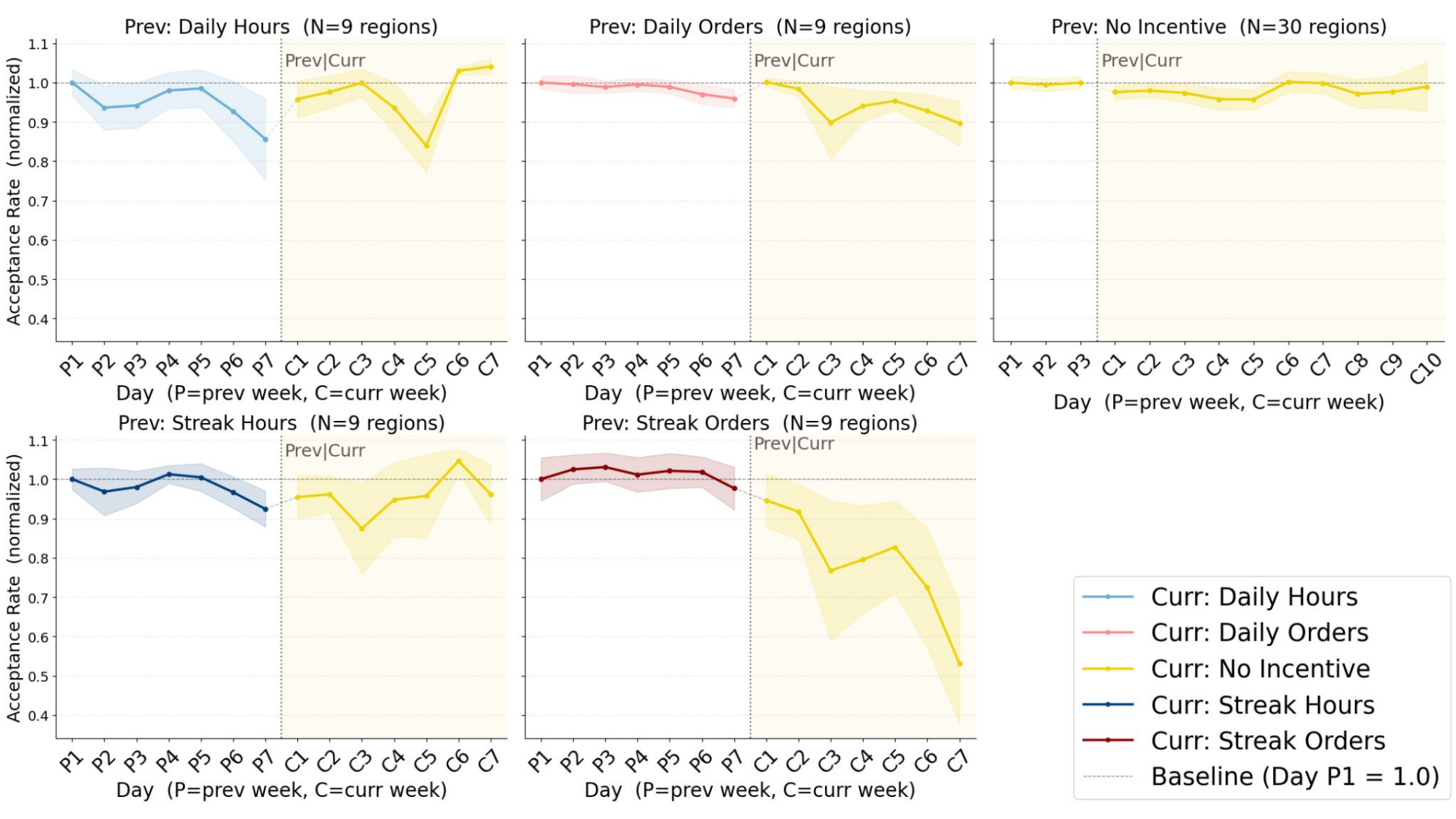

Prev: Daily Hours (N=3 regions)
Prev: No Incentive (N=12 regions)
Prev: Streak Hours (N=3 regions)
Prev: Streak Orders (N=3 regions)
Prev|Curr
Hours Worked (normalized)
Day (P=prev week, C=curr week)
Curr: Daily Hours
Curr: Daily Orders
Curr: No Incentive
Curr: Streak Hours
Curr: Streak Orders
Baseline (Day P1 = 1.0)

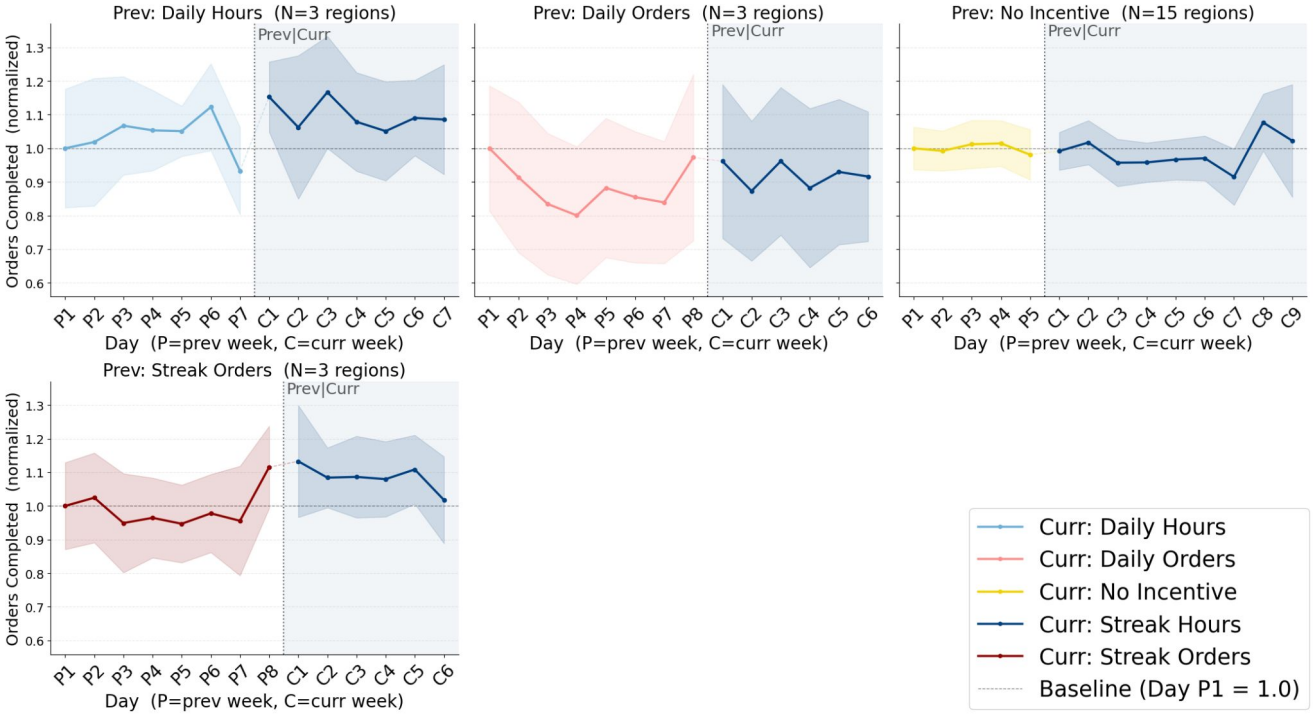

Prev: Daily Hours (N=3 regions)
Prev: No Incentive (N=12 regions)
Prev: Streak Hours (N=3 regions)
Prev: Streak Orders (N=3 regions)
Prev|Curr
Acceptance Rate (normalized)
1.05
1.00
0.95
0.90
0.85
P1 P2 P3 P4 P5 P6 P7 P8 C1 C2 C3 C4 C5 C6
P1 P2 P3 P4 P5 C1 C2 C3 C4 C5 C6 C7 C8 C9
P1 P2 P3 P4 P5 P6 P7 C1 C2 C3 C4 C5 C6 C7
Day (P=prev week, C=curr week)
Curr: Daily Hours
Curr: Daily Orders
Curr: No Incentive
Curr: Streak Hours
Curr: Streak Orders
Baseline (Day P1 = 1.0)



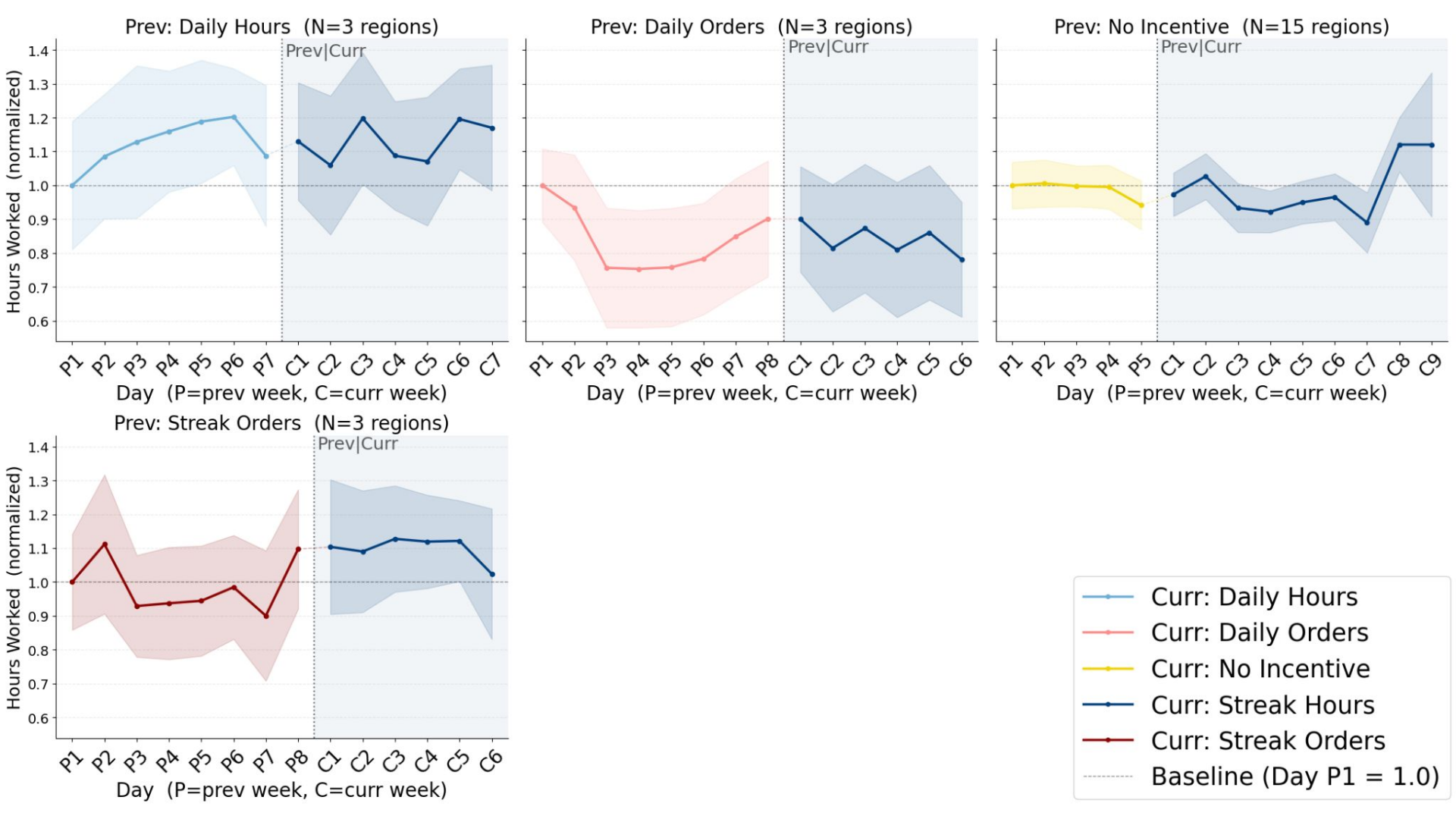
- No incentive week to no incentive is pretty stable and consistent (as we would expect)
- Order level incentives (especially Streak Orders) to No Incentive has a consistent increase from the previous week into the No Incentive week, indicating a carry over effect, especially in terms of orders completed

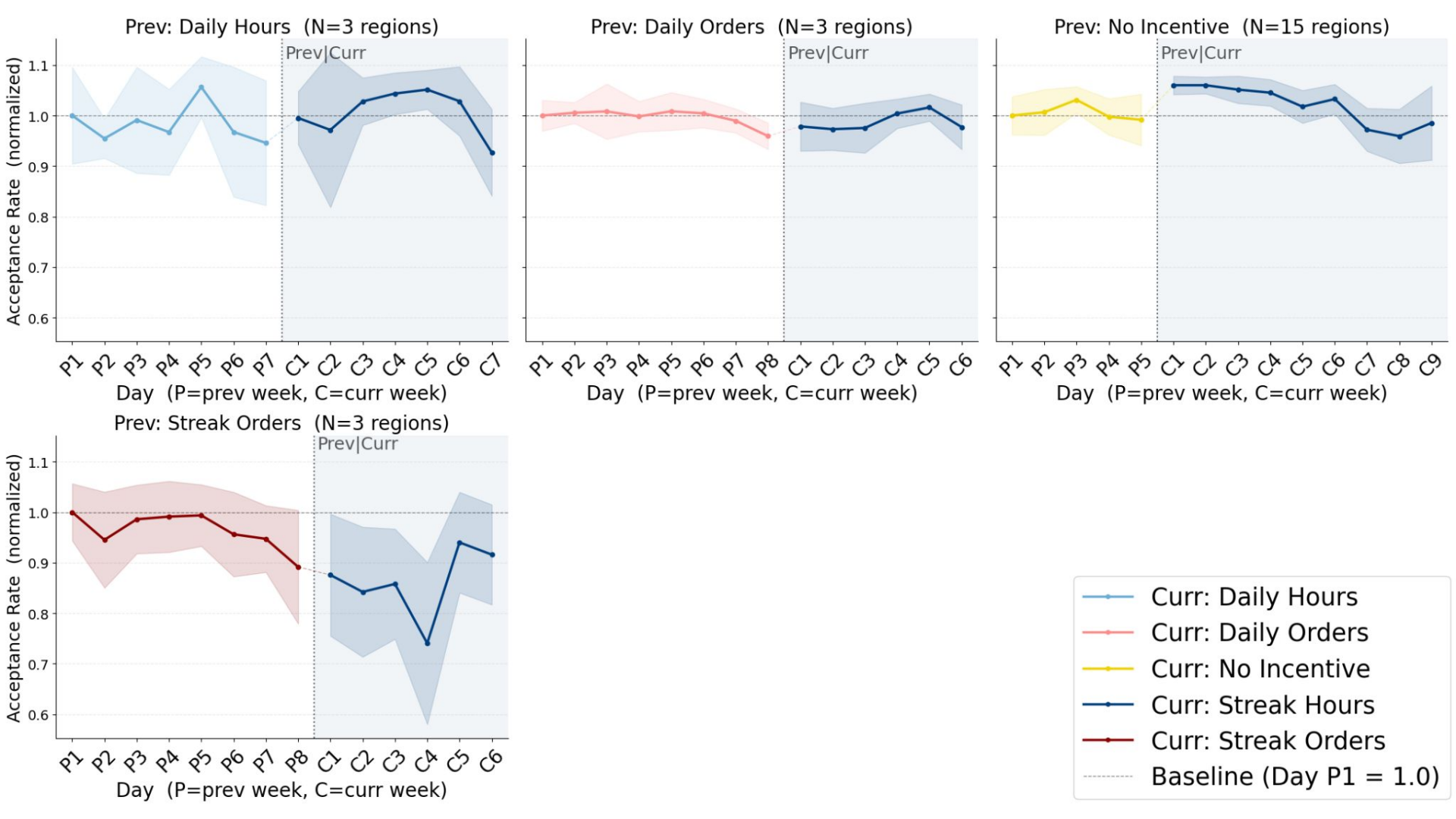

Prev: Daily Hours (N=9 regions)
Prev: Daily Orders (N=9 regions)
Prev: No Incentive (N=30 regions)
Prev: Streak Hours (N=9 regions)
Prev: Streak Orders (N=9 regions)
Prev|Curr
Hours Worked (normalized)
Day (P=prev week, C=curr week)
P1 P2 P3 P4 P5 P6 P7 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10
Curr: Daily Hours
Curr: Daily Orders
Curr: No Incentive
Curr: Streak Hours
Curr: Streak Orders
Baseline (Day P1 = 1.0)

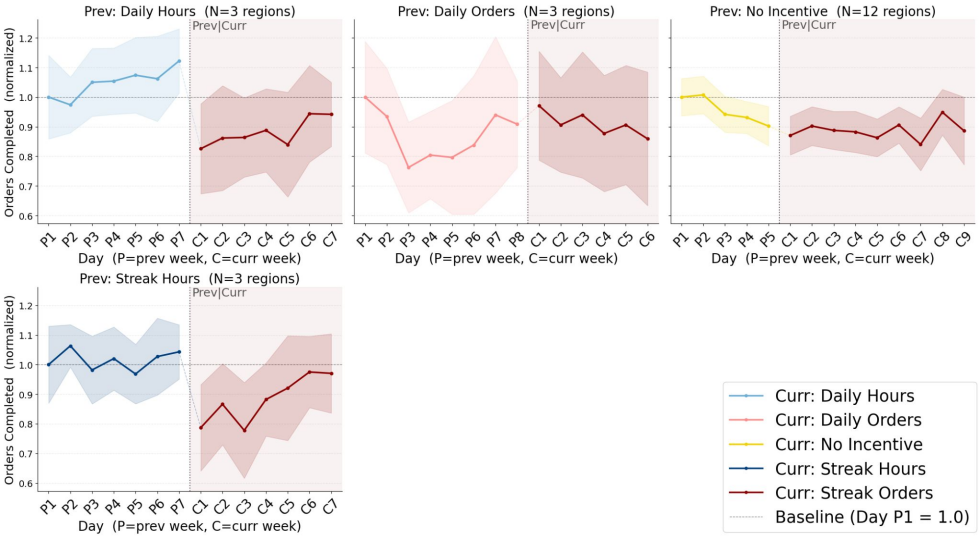

Prev: Daily Hours (N=9 regions)
Prev: Daily Orders (N=9 regions)
Prev: No Incentive (N=30 regions)
Prev: Streak Hours (N=9 regions)
Prev: Streak Orders (N=9 regions)
Prev|Curr
Acceptance Rate (normalized)
Day (P=prev week, C=curr week)
P1 P2 P3 P4 P5 P6 P7 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10
Curr: Daily Hours
Curr: Daily Orders
Curr: No Incentive
Curr: Streak Hours
Curr: Streak Orders
Baseline (Day P1 = 1.0)



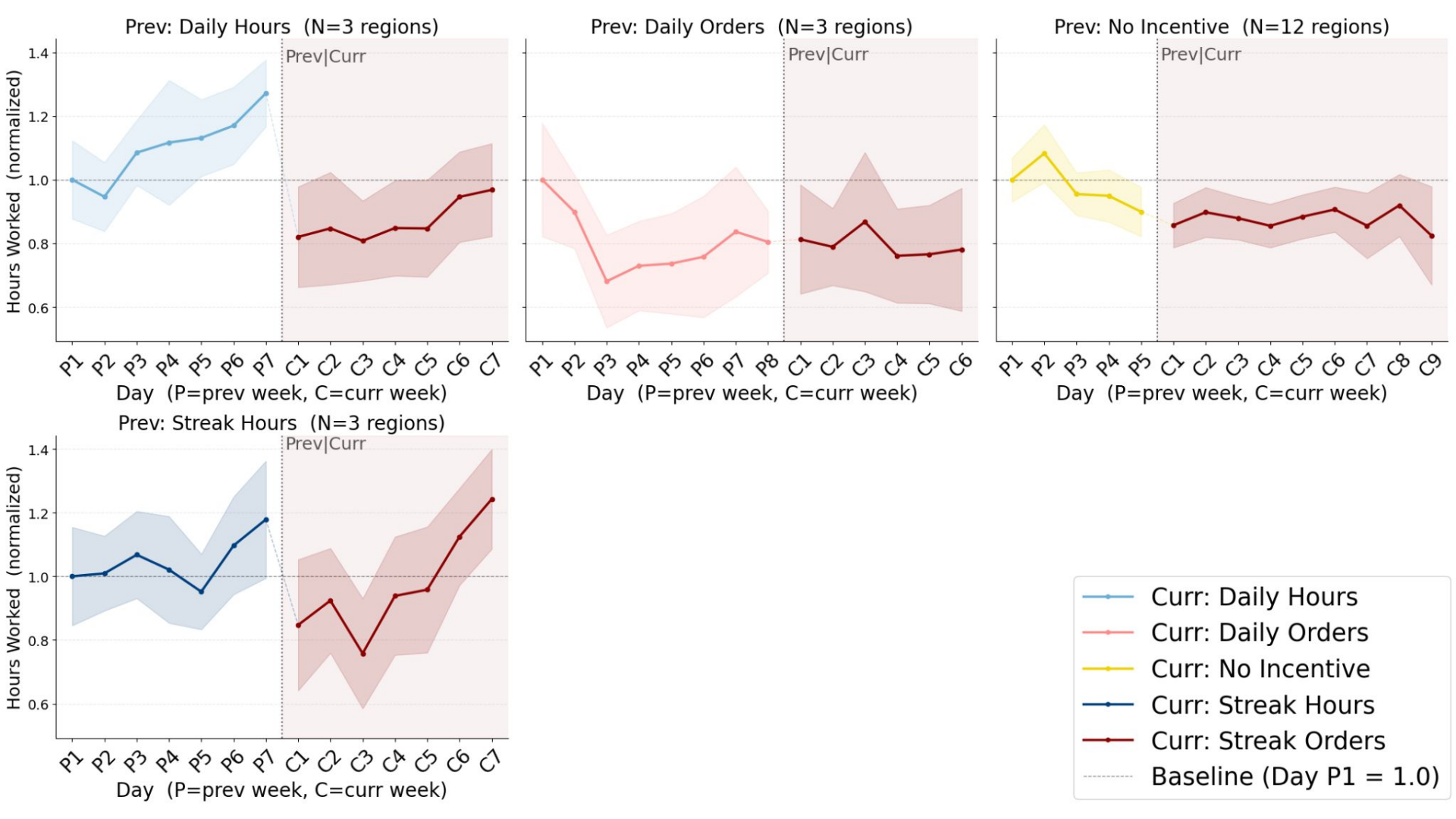
Regardless of the previous week's incentive, Streak Hours tends to follow the same trend of productivity (no crazy spikes/dips throughout this week, roughly same amount of orders completed/hours worked as previous week)

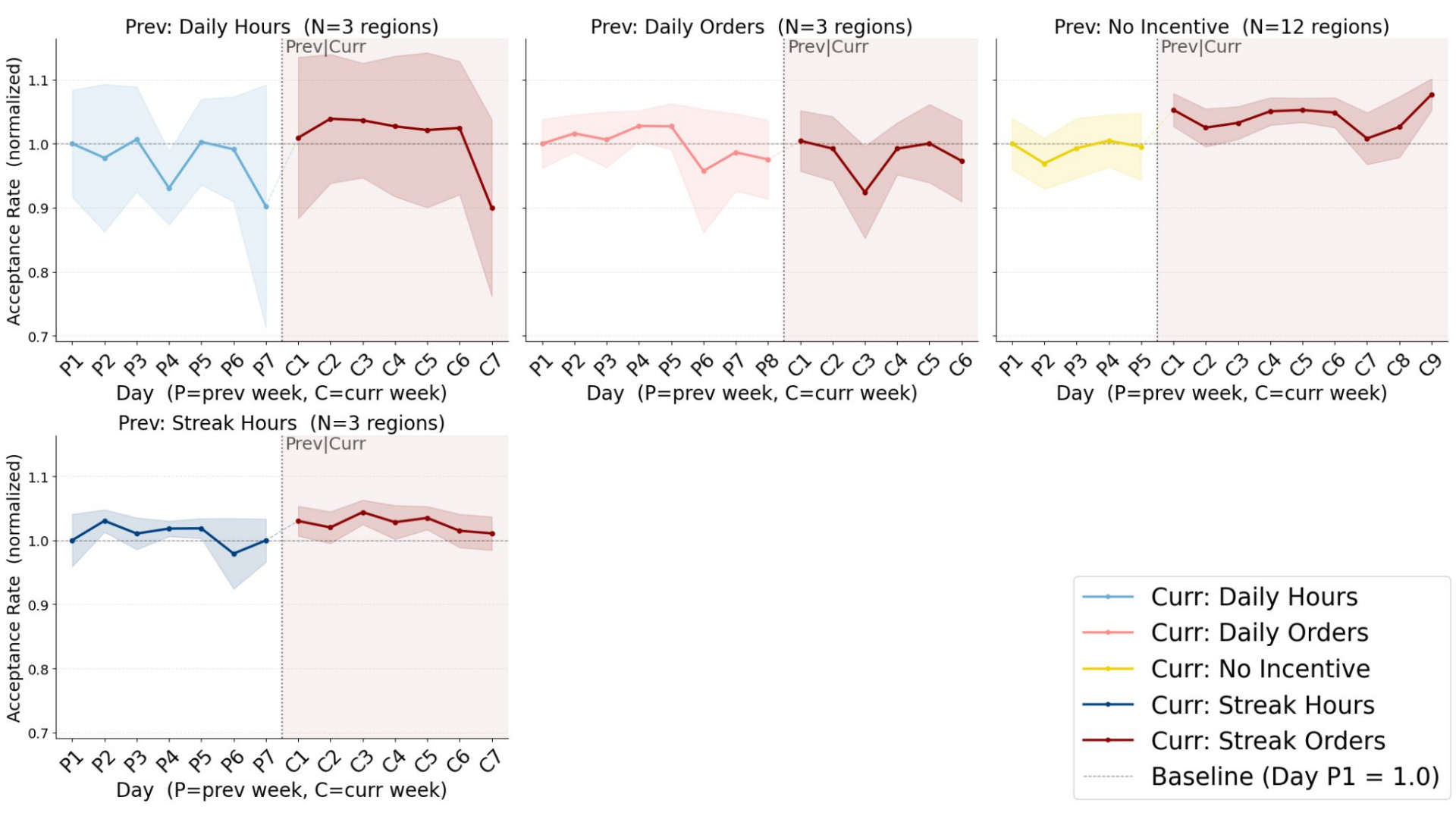

Prev: Daily Hours (N=3 regions)
Prev: Daily Orders (N=3 regions)
Prev: No Incentive (N=15 regions)
Prev: Streak Orders (N=3 regions)
Prev|Curr
Hours Worked (normalized)
Day (P=prev week, C=curr week)
Curr: Daily Hours
Curr: Daily Orders
Curr: No Incentive
Curr: Streak Hours
Curr: Streak Orders
Baseline (Day P1 = 1.0)

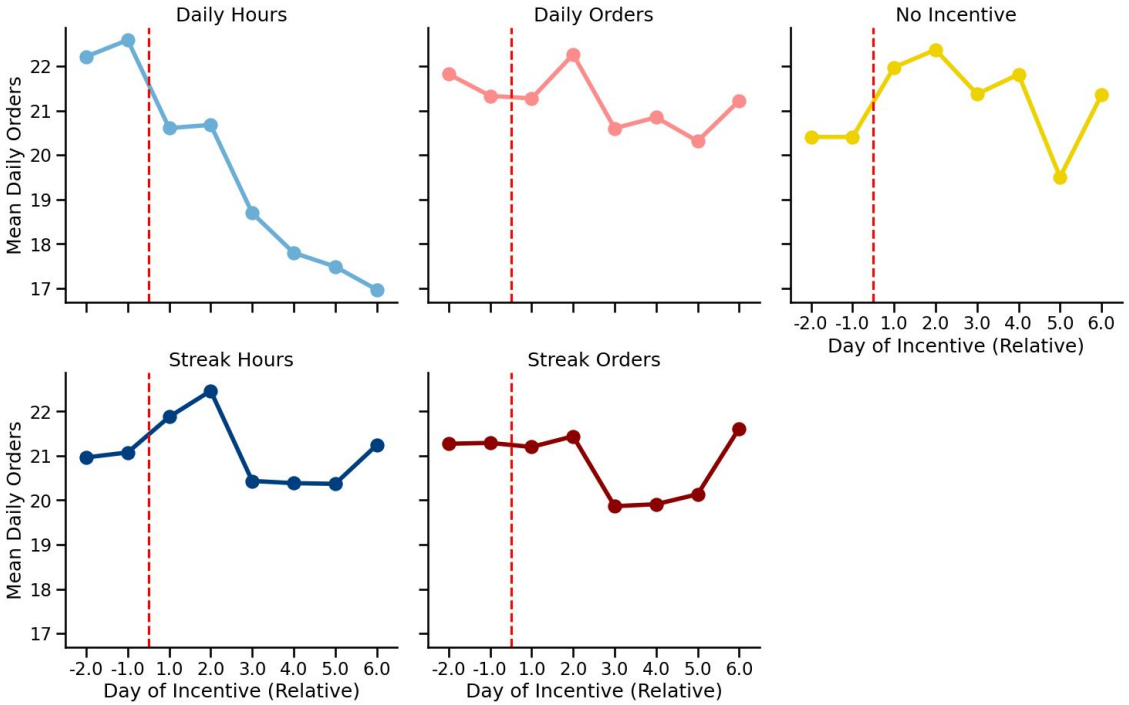

Prev: Daily Hours (N=3 regions)
Prev: Daily Orders (N=3 regions)
Prev: No Incentive (N=15 regions)
Prev: Streak Orders (N=3 regions)
Prev|Curr
Acceptance Rate (normalized)
Day (P=prev week, C=curr week)
Curr: Daily Hours
Curr: Daily Orders
Curr: No Incentive
Curr: Streak Hours
Curr: Streak Orders
Baseline (Day P1 = 1.0)



- Initial drop in productivity compared to previous week when coming from Streak Hours or Daily Hours, but recovers back to roughly baseline
- When coming from No Incentive or Daily Orders, tends to behave roughly the same throughout the week

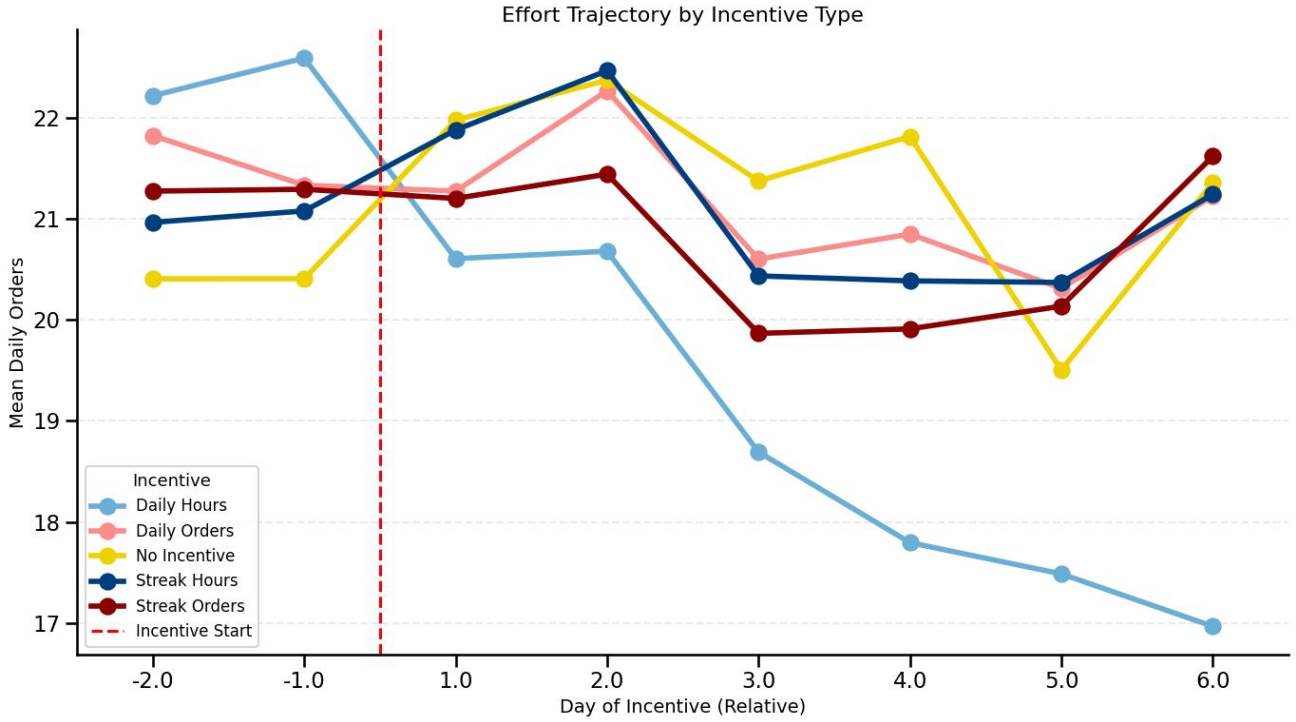

Prev: Daily Hours (N=3 regions)
Prev: Daily Orders (N=3 regions)
Prev: No Incentive (N=12 regions)
Prev: Streak Hours (N=3 regions)
Prev|Curr
Hours Worked (normalized)
Day (P=prev week, C=curr week)
Curr: Daily Hours
Curr: Daily Orders
Curr: No Incentive
Curr: Streak Hours
Curr: Streak Orders
Baseline (Day P1 = 1.0)


Prev: Daily Hours (N=3 regions)
Prev: Daily Orders (N=3 regions)
Prev: No Incentive (N=12 regions)
Prev: Streak Hours (N=3 regions)
Prev|Curr
Acceptance Rate (normalized)
Day (P=prev week, C=curr week)
Curr: Daily Hours
Curr: Daily Orders
Curr: No Incentive
Curr: Streak Hours
Curr: Streak Orders
Baseline (Day P1 = 1.0)

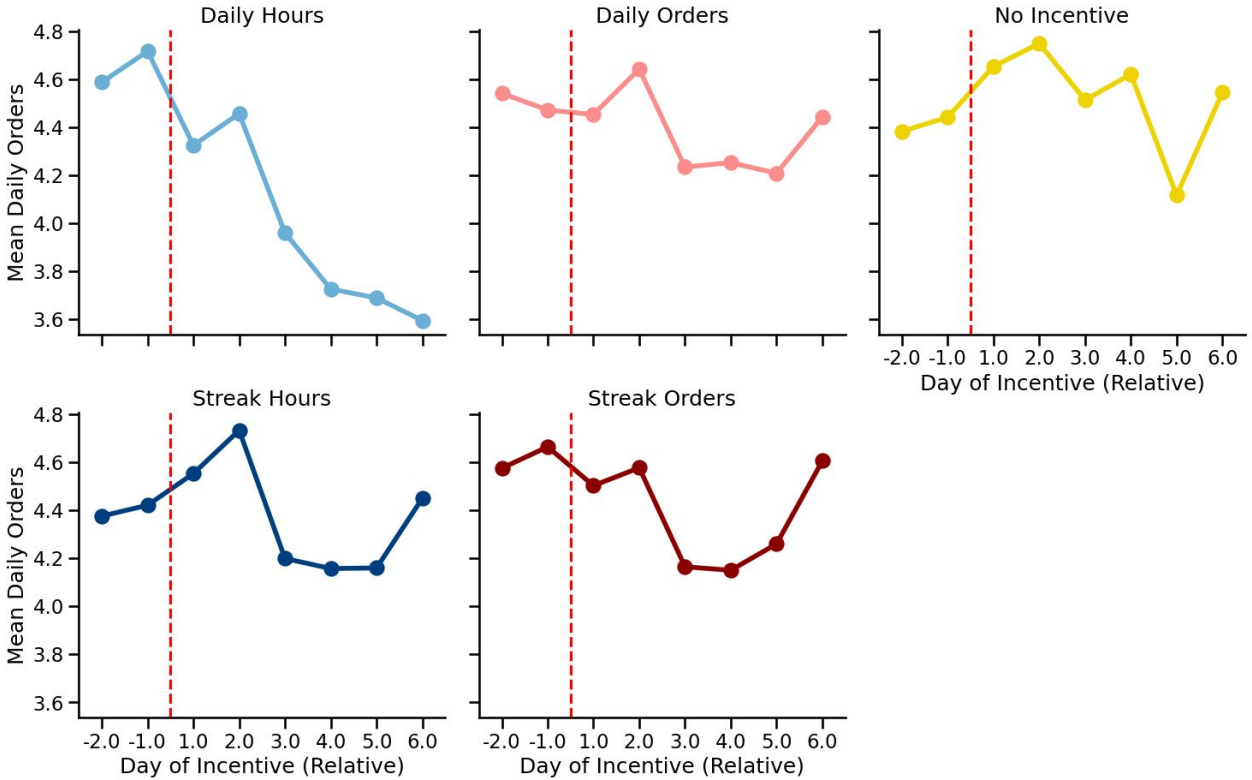


Novelty/Shock factor is apparent in the number of orders completed daily

- Initial spike around the introduction of the incentive, then a drop, and then a recovery near the end of the week (especially for streak-level incentives where the end of the week is where the goal is focused e.g. required days)
- Burn out for Daily Hours, where there is a slight initial stabilization right after the introduction of the incentive before it continues to drop

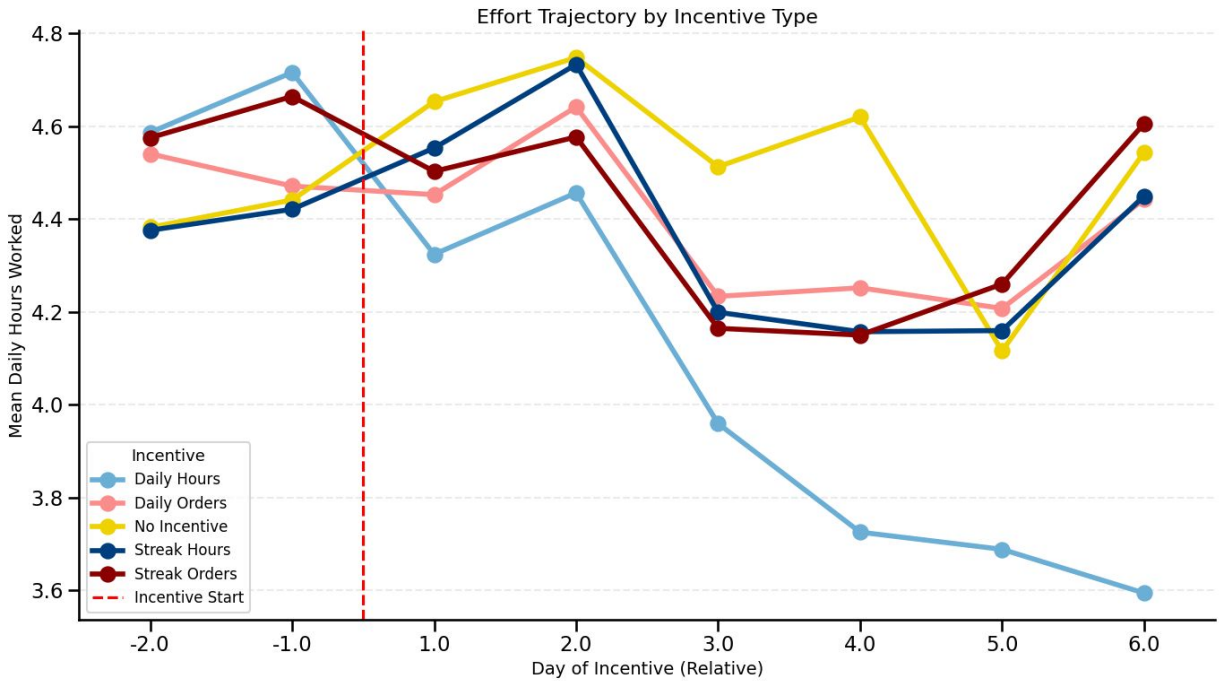


- Most incentives have a spike, and then a bigger drop than No Incentive (maybe burn out from working, or they made enough money from the bonuses to not work during the week days), before reaching a recovery around the end of the week (weekend)
- Streak level incentives have the highest recovery



Novelty/Shock factor is apparent in the number of Hours worked

- Initial spike around the introduction of the incentive, then a drop, and then a recovery near the end of the week (especially for streak-level incentives where the end of the week is where the goal is focused e.g. required days)
- Burn out for Daily Hours, where there is a slight initial spike in hours worked right after the introduction of the incentive before it continues to drop



- There is an even clearer spike then drop for most incentives during the weekdays before the apparent recovery near the end of the week in terms of mean daily hours worked
- Streak level incentives have the highest recovery

Mapping between 30 cities and bangkok regions

Matched_BKK_Districts are in (BKK_region, distance) format

Calculated distance based on mean daily wage, mean daily hours worked, mean daily orders and num drivers in total + of each level (baselines of BKK and 30 cities)

	30_City	Matched_BKK_Districts
0	CHANTHABURI	[(Mueang Phayao, 1.321), (Banphot Phisai, 1.321), (Ban Pho, 1.321), (Huai Phueng, 1.321)]
1	CHIANGRAI	[(Thoen, 2.644), (Sam Khok, 2.658), (Nakhon Chai Si, 2.701), (Bang Pa-In, 2.708)]
2	CHUMPHON	[(Mueang Rayong, 1.17), (Pluak Daeng, 1.269), (Kantharawichai, 1.32), (Mueang Narathiwat, 1.341)]
3	HAT YAI	[(Lat Lum Kaeo, 2.875), (Phayuha Khiri, 2.908), (Bang Sai, 3.019), (Samphanthawong, 3.096)]
4	KANCHANABURI	[(Kaeng Khoi, 1.051), (Nong Yai, 1.057), (Bueng Na Rang, 1.063), (Nong Khae, 1.065)]
5	KHONKAEN	[(N, 1.703), (Nong Chok, 2.692), (Phra Samut Chedi, 3.108), (Phutthamonthon, 3.137)]
6	KRABI	[(Uthai, 1.592), (Mueang Prachin Buri, 1.676), (Mueang Kanchanaburi, 1.68), (Mueang Nakhon Pathom, 1.869)]
7	LAMPANG	[(Tha Mai, 1.432), (Mueang Mukdahan, 1.432), (Ban Khwao, 2.022), (Khao Yoi, 2.12)]
8	NAKHONNAYOK	[(Mueang Yasothon, 0.671), (Sai Ngam, 0.734), (Mueang Saraburi, 0.76), (Mueang Chiang Mai, 0.98)]
9	NAKHONPATHOM	[(Bang Bo, 2.223), (Bang Sao Thong, 2.397), (Ban Phaeo, 2.513), (Sai Noi, 2.529)]
10	NAKHONSAWAN	[(Mueang Nakhon Nayok, 0.393), (Khao Saming, 0.414), (Pla Pak, 0.425), (Phanom Phrai, 0.44)]
11	NAKHONSRITHAMMARAT	[(Ban Dung, 1.371), (Tan Sum, 1.371), (Pak Thong Chai, 1.371), (Nong Prue, 1.371)]
12	NONGKHAI	[(Pak Chong, 1.012), (Mueang Samut Songkhram, 1.023), (Wang Nuea, 1.024), (Mueang Udon Thani, 1.025)]
13	PHAYAO	[(Photharam, 0.841), (Khanu Woralaksaburi, 0.846), (Phra Nakhon Si Ayutthaya, 0.849), (Mueang Trang, 0.849)]
14	PHETCHABURI_Chaam	[(Na Kae, 0.696), (Phachi, 0.754), (Mueang Chai Nat, 0.807), (Mueang Chon Buri, 0.85)]
15	PRACHINBURI	[(Kosum Phisai, 1.196), (Lahan Sai, 1.207), (Ban Phai, 1.214), (Amphawa, 1.216)]
16	RATCHABURI_Banpong	[(Mueang Buri Ram, 0.91), (Mueang Chachoengsao, 0.92), (Mueang Roi Et, 0.937), (Bang Pla Ma, 0.968)]
17	SAKAEO_Aranyaprathet	[(Mueang Phuket, 0.707), (Mueang Nakhon Phanom, 0.725), (Sattahip, 0.741), (Nong Suea, 0.752)]
18	SAKONNAKHON	[(Khiri Mat, 1.376), (Wihan Daeng, 1.376), (Lom Sak, 1.376), (Si Sawat, 1.376)]
19	SARABURI_Nongkhae	[(Wiset Chai Chan, 0.78), (Ongkharak, 0.81), (Si Songkhram, 0.816), (Sida, 0.823)]
20	SARABURI_Phraphutthabat	[(Mueang Phrae, 0.25), (Mueang Surin, 0.312), (Mueang Ubon Ratchathani, 0.367), (Mueang Uthai Thani, 0.487)]
21	SISAKET	[(Uthumphon Phisai, 1.16), (Ban Bueng, 1.167), (Samrong Thap, 1.173), (Lat Bua Luang, 1.182)]
22	SONGKHLA_City	[(Phanom Sarakham, 1.113), (Khemarat, 1.115), (Khao Wong, 1.124), (Phon Sai, 1.131)]
23	SURATTHANI_City	[(Non Sila, 0.732), (Det Udom, 0.732), (Si Racha, 0.743), (Wang Noi, 0.781)]
24	SURIN	[(Sawang Arom, 1.295), (Phrom Buri, 1.302), (Cha-Am, 1.304), (Khlong Lan, 1.305)]
25	TAK_Maesot	[(Nikhom Phatthana, 1.08), (Betong, 1.086), (Bang Len, 1.087), (Pakham, 1.092)]
26	TRAT	[(Khon Buri, 0.914), (Mueang Ratchaburi, 0.926), (Makham, 1.004), (Lan Sak, 1.005)]
27	UDONTHANI	[(Thap Than, 1.272), (Waeng Yai, 1.28), (Ban Mo, 1.282), (Mueang Nakhon Ratchasima, 1.282)]
28	UTTARADIT	[(Ban Laem, 0.219), (Lat Yao, 0.224), (Nong Han, 0.34), (Khok Charoen, 0.384)]
29	YASOTHON	[(Mueang Lampang, 0.618), (Mueang Si Sa Ket, 0.635), (Bang Lamung, 0.669), (Ban Pong, 0.671)]

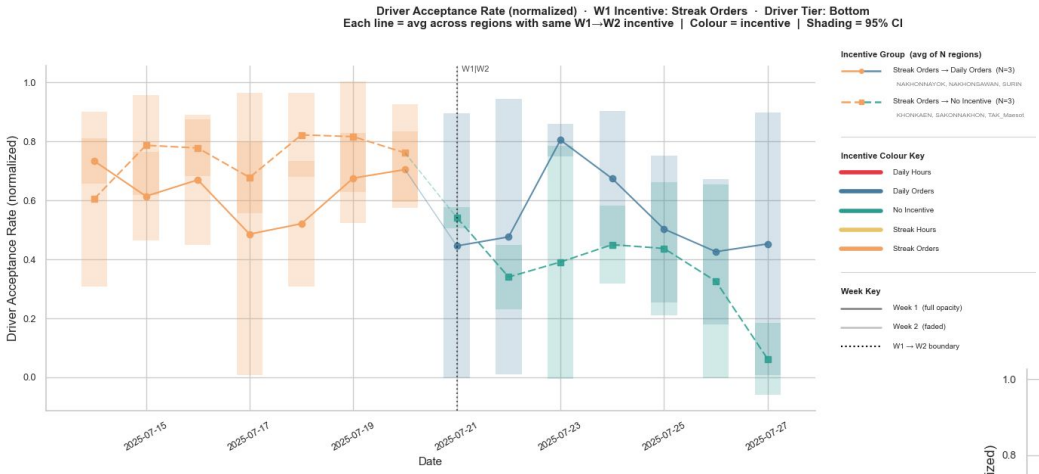
	Bangkok_District	Matched_30_City
0	Ban Laem	UTTARADIT
1	Lat Yao	UTTARADIT
2	Mueang Phrae	SARABURI_Phraphutthabat
3	Mueang Surin	SARABURI_Phraphutthabat
4	Nong Han	UTTARADIT
5	Mueang Ubon Ratchathani	SARABURI_Phraphutthabat
6	Khok Charoen	UTTARADIT
7	Mueang Nakhon Nayok	NAKHONSAWAN
8	Khao Saming	NAKHONSAWAN
9	Pla Pak	NAKHONSAWAN
10	Phanom Phrai	NAKHONSAWAN
11	Mueang Uthai Thani	SARABURI_Phraphutthabat
12	Mueang Lampang	YASOTHON
13	Mueang Si Sa Ket	YASOTHON
14	Bang Lamung	YASOTHON
15	Ban Pong	YASOTHON
16	Mueang Yasothon	NAKHONNAYOK
17	Na Kae	PHETCHABURI_Chaam
18	Mueang Phuket	SAKAEO_Aranyaprathet
19	Mueang Nakhon Phanom	SAKAEO_Aranyaprathet
20	Non Sila	SURATTHANI_City
21	Det Udom	SURATTHANI_City
22	Sai Ngam	NAKHONNAYOK
23	Sattahip	SAKAEO_Aranyaprathet
24	Si Racha	SURATTHANI_City
25	Nong Suea	SAKAEO_Aranyaprathet
26	Phachi	PHETCHABURI_Chaam
27	Mueang Saraburi	NAKHONNAYOK
28	Wiset Chai Chan	SARABURI_Nongkhae
29	Wang Noi	SURATTHANI_City
30	Mueang Chai Nat	PHETCHABURI_Chaam
31	Ongkharak	SARABURI_Nongkhae
32	Si Songkhram	SARABURI_Nongkhae
33	Sida	SARABURI_Nongkhae
34	Photharam	PHAYAO
35	Khanu Woralaksaburi	PHAYAO
36	Phra Nakhon Si Ayutthaya	PHAYAO
37	Mueang Trang	PHAYAO
38	Mueang Chon Buri	PHETCHABURI_Chaam
39	Mueang Buri Ram	RATCHABURI_Banpong
40	Khon Buri	TRAT
41	Mueang Chachoengsao	RATCHABURI_Banpong
42	Mueang Ratchaburi	TRAT
43	Mueang Roi Et	RATCHABURI_Banpong
44	Bang Pla Ma	RATCHABURI_Banpong
45	Mueang Chiang Mai	NAKHONNAYOK
46	Makham	TRAT
47	Lan Sak	TRAT
48	Pak Chong	NONGKHAI
49	Mueang Samut Songkhram	NONGKHAI
50	Wang Nuea	NONGKHAI
51	Mueang Udon Thani	NONGKHAI
52	Kaeng Khoi	KANCHANABURI
53	Nong Yai	KANCHANABURI
54	Bueng Na Rang	KANCHANABURI
55	Nong Khae	KANCHANABURI
56	Nikhom Phatthana	TAK_Maesot
57	Betong	TAK_Maesot
58	Bang Len	TAK_Maesot
59	Pakham	TAK_Maesot
60	Phanom Sarakham	SONGKHLA_City
61	Khemarat	SONGKHLA_City
62	Khao Wong	SONGKHLA_City
63	Phon Sai	SONGKHLA_City
64	Uthumphon Phisai	SISAKET
65	Ban Bueng	SISAKET
66	Mueang Rayong	CHUMPHON
67	Samrong Thap	SISAKET
68	Lat Bua Luang	SISAKET
69	Kosum Phisai	PRACHINBURI
70	Lahan Sai	PRACHINBURI
71	Ban Phai	PRACHINBURI
72	Amphawa	PRACHINBURI
73	Pluak Daeng	CHUMPHON
74	Thap Than	UDONTHANI
75	Waeng Yai	UDONTHANI
76	Ban Mo	UDONTHANI
77	Mueang Nakhon Ratchasima	UDONTHANI
78	Sawang Arom	SURIN
79	Phrom Buri	SURIN
80	Cha-Am	SURIN
81	Khlong Lan	SURIN
82	Kantharawichai	CHUMPHON
83	Mueang Phayao	CHANTHABURI
84	Banphot Phisai	CHANTHABURI
85	Ban Pho	CHANTHABURI
86	Huai Phueng	CHANTHABURI
87	Mueang Narathiwat	CHUMPHON
88	Ban Dung	NAKHONSRITHAMMARAT
89	Tan Sum	NAKHONSRITHAMMARAT
90	Pak Thong Chai	NAKHONSRITHAMMARAT
91	Nong Prue	NAKHONSRITHAMMARAT
92	Khiri Mat	SAKONNAKHON
93	Wihan Daeng	SAKONNAKHON
94	Lom Sak	SAKONNAKHON
95	Si Sawat	SAKONNAKHON
96	Tha Mai	LAMPANG
97	Mueang Mukdahan	LAMPANG
98	Uthai	KRABI
99	Mueang Prachin Buri	KRABI
100	Mueang Kanchanaburi	KRABI
101	N	KHONKAEN
102	Mueang Nakhon Pathom	KRABI
103	Ban Khwao	LAMPANG
104	Khao Yoi	LAMPANG
105	Bang Bo	NAKHONPATHOM
106	Bang Sao Thong	NAKHONPATHOM
107	Ban Phaeo	NAKHONPATHOM
108	Sai Noi	NAKHONPATHOM
109	Thoen	CHIANGRA
110	Sam Khok	CHIANGRA
111	Nong Chok	KHONKAEN
112	Nakhon Chai Si	CHIANGRA
113	Bang Pa-In	CHIANGRA
114	Lat Lum Kaeo	HAT YA
115	Phayuha Khiri	HAT YA
116	Bang Sai	HAT YA
117	Samphanthawong	HAT YA
118	Phra Samut Chedi	KHONKAEN
119	Phutthamonthon	KHONKAEN

Math Modeling Insights

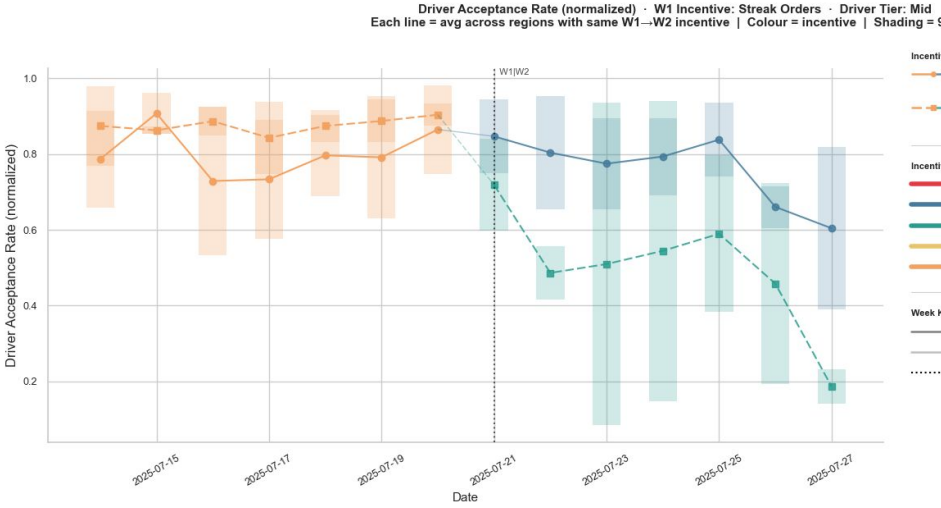
Metric Effect on Acceptance Intensity

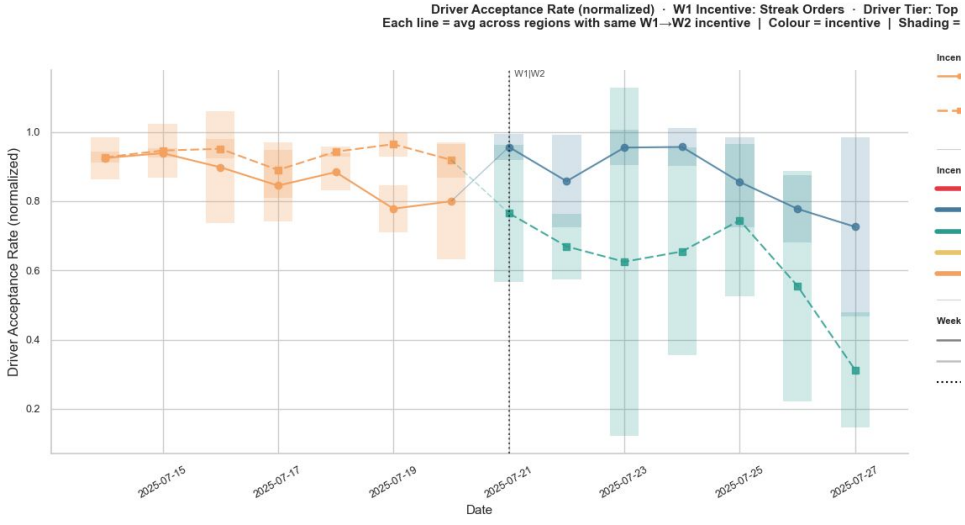
Holding the reward horizon fixed, throughput-based contracts create a stronger direct incentive to increase acceptance intensity (a) than availability-based contracts, and more sensitive to market conditions.

- Attainment Probability is $A_Q(h, a, \theta; \bar{Q})$
  - Assumption: Increasing in a and increasing differences in (a, θ)
- Availability-based contracts:
  - qualification depends on hours only
  - acceptance a has no direct payoff channel
- Throughput-based contracts:
  - qualification depends on output threshold Q
  - acceptance intensity directly affects success probability



Streak Order to Daily Order and No Incentive contract changes. Can see the acceptance intensity dropped for the latter one.

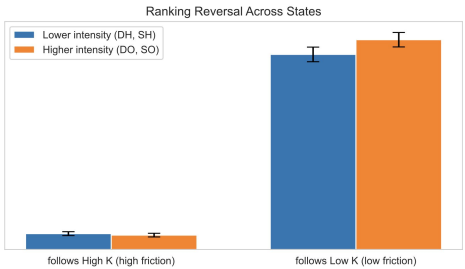




Ranking Reversal

Suppose the inequality $\mathcal{Q}_2(z^A, z^H) - \mathcal{Q}_2(z^B, z^H) \geq \mathcal{Q}_2(z^A, z^L) - \mathcal{Q}_2(z^B, z^L).$ is strict for predecessor zA is more participation-building than zB and zH is more throughput-intensive than zL and the static output gap between zH and zL is sufficiently small. Then the ranking of zH and zL can reverse across predecessor states.

$$[\mathcal{Q}_2(z^A, z^H) - \mathcal{Q}_2(z^B, z^H)] - [\mathcal{Q}_2(z^A, z^L) - \mathcal{Q}_2(z^B, z^L)] > |\Delta\mathcal{Q}(K_2(z^B))|$$



- Predecessor contracts change participation friction K
- This affects successors differently:
  - zH: more sensitive to reductions in friction
  - zL: less sensitive
- If the induced gain exceeds the static output gap, rankings flip

Progress Effect

Under assumption of continuation value Wd+1(K, r, s; z) is weakly increasing in s, for state-dependent contract z, the progress premium Δd(s; z) is weakly increasing in the progress state s. For reset contracts, Δd(s; z) is state-independent.

Within-cycle value function: $$V_t(K_t, r_t; z_t) = \mathbb{E}\left[\sum_{d=1}^{D} \max_{x_{td}, h_{td}, a_{td}} \left\{u_{td}(z_t) + \beta \mathbb{E}\left[W_{t,d+1}(K_t, r_t, s_{t,d+1}; z_t) \,\middle|\, s_{td}, h_{td}, a_{td}\right]\right\}\right]$$

Progress Premium: $$\begin{aligned}\Delta_d(s; z) = {} & \pi_z(s, 1, d) - \pi_z(s, 0, d) \\ & + \beta \mathbb{E}\Big[W_{d+1}(K, r, T_z(s, 1, d); z) - W_{d+1}(K, r, T_z(s, 0, d); z)\Big]\end{aligned}$$

- Progress Premium Δd(s;z) rises as we get closer to the goal
- At goal attainment:
  - Δd(s;z) drops to zero
  - Creates a drop in continuation value and mass quitting