**Appendix:**

Separation and Measurable Regressions



Close Gap Regressions



Ball Skills Regressions

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Salary Data:

A picture containing text, electronics, receipt

Description automatically generated

*Field Identification System*

*Areas of the Field*

- The Columnis the area on each side of the field that extends from the sideline to just inside of the #1 receiver. This area only contains the “column” player, who is almost always a cornerback. Regardless of the player’s roster position, this player is a key piece of the shell.

- The Alley is the area on each side of the field that extends from the column line on the outside to either the midpoint between the #2 and #3 receiver (if it is a 3-receiver side), or to just outside the tackle box (where a 3-point stance tight end would line up). In few cases where the #1 is in as tight as or even inside a typical tight end’s alignment, the alley does not exist.

- The Channel is the area between the alleys. Inside the channel is the tackle box.

- The Chute is the combined area of the alleys and the channel.

Diagram

Description automatically generated

A picture containing graphical user interface

Description automatically generated

*Player Types:*

Column Defenders are coverage-priority players who align over #1 on each side of the ball. These players are typically listed as cornerbacks on rosters. The depth of the column defender at the snap helps determine the shell. We define them as players in “the column” (see Figure). They are crucial to identifying the overall coverage structure.

Conflict Defenders are players who align close to the line of scrimmage in the space between #1 and the box. Consequently, these players often play with a run/pass conflict (though they do not always play with one if they are detached or in man coverage). These players are typically listed as outside linebackers, cornerbacks (nickel corners), and strong safeties. We define them as players in “the alley” (see Figure). They are key defenders in reading a defense, but the shell and overall coverage can be determined without understanding their responsibilities.

Adjacent Defenders are players in the box. They are typically inside linebackers or in some cases strong/box safeties. These players are typically responsible for interior run gaps and play with a run/pass conflict inside the box. They are not key to identifying the shell, and align in the channel.

Safeties are players toward the center of the field and furthest away from the ball. They are the most important defenders for determining the shell, as they determine whether the middle of the field is open or closed (1-high vs. 2-high structure). Safeties are the two deepest defensive players in the chute (or in the column in certain situations) at the snap. Safeties do not need to be listed on rosters as safeties, but do need to be some kind of defensive back (It is extremely rare that a defensive coordinator would rely upon a linebacker to have a deep-half or deep-MOF responsibility. In Tampa 2, middle linebackers can deny the MOF but aren’t themselves deep safeties as Tampa 2 is still a split-safety concept).

*Shell Identification*

For purposes of identifying the shell we need to identify the two column players and the two safeties. After identifying the safeties as laid out above, we evaluate their relative position eight tenths of a second into the play. The safeties are evaluated by their positions at this point because defenses will frequently disguise coverages prior to the snap. In cases where defenses do disguise their coverages and “roll” or “rotate” their coverages, they must do so immediately after the snap. Because deep safeties are by definition separated from potential offensive threats by a buffer of space, looking at the position of the safeties eight tenths of a second into the play gives a snapshot allows us to observe safety rotations after they have occurred but before the locations of the safeties have been skewed by vertical receiving threats. The depth and the angle formed between the two safeties at this point determines if the defense takes on a one-high or a two-high structure. If the angle formed between the safeties is shallow (and the safeties are both above 7 yards), then defense has taken on a 2-high, split-safety structure. If the angle is steeper (or if the lower safety is below 7 yards), the defense has taken on a 1-high, middle-closed structure.

The angle to determine the structure varies based on a few factors, most importantly the difference in the number of defenders and number of offensive players in the column and alley on one side of the ball. Ultimately, a safety is simply a deep player who is an “extra” hat in coverage. Consider a play where the offense is in a 2x2 set, with two detached receivers on each side of the ball. As such, the defense needs to allocate at least two players  to detach and play coverage on those two receivers. A “safety” is simply an additional player who gives the defense a numbers advantage in the deep part of the field. So if a team is playing with two-high safeties, they have a 1-man advantage on both sides of the field vs. the proposed 2x2 set. Conversely, a team playing with 1-high safety will typically put him in the middle of the field, giving the defense an advantage over the middle, but leaving numbers even on the perimeter. As such, if the defense has a numbers advantage in the column and alley on both sides of the field, they are more likely to be playing split-safety. Consequently, we allow for more wiggle room in the safety angle if the defense (allowing for steeper angles between the safeties).

After the safety structure is determined, we then identify the depth of the cornerbacks. This is important for distinguishing between Cover 2, 4, and, 6, as both corners are deep in Cover 4 (likely to play deep quarters), both low in Cover 2, and one high one low in Cover 6.

Corner depth is less relevant for one-high structures, as corners can play a deep third from a shallow alignment (although they are less likely to from that depth).

*Individual Coverage Labels*

After we determine the shell, we utilize the coverage labels and number of pass rushers to determine the specific coverage. Corners and safeties follow different rules. If the shell ID has determined that a player is a deep safety, responsible for a deep-half/third/quarter/middle zone, he is a zone defender. If he is close enough to his nearest offensive player, and is facing toward the receiver a few tenths of a second after the snap, he is in man (coverage players can disguise their intents pre-snap, but post snap must face their receiver and “Declare” their coverage or else they will get beat).

If a corner is more than 10 yards laterally from his nearest teammate, and is less than 9 yards off the ball, he must be in man. 10 yards to the left or right is too much space for any defender to cover in coverage without being in man (ie: in cover 3, the corner can’t pass off the post and become the wheel player on a switch if he is that far away). After this step, the same rules about facing the quarterback or facing the receiver to determine man or zone apply.

**Coverage Label Glossary**

* Cover 0: An all out blitz defined by man coverage and zero extra players in coverage/deep safeties.
* Cover 1: A man coverage with a single-high safety structure (low safety is in man or is a “robber” (extra underneath zone defender).
* Cover 2: A zone coverage with two high safeties and low, zone corners who play the flat.
  + 2 Lock: Cover 2 except one of the corners is in man, not zone
  + Cover 42: “Four under, two deep.” Cover 2 but with only six defenders.
  + Cover 28: Cover 2 but with an extra (eighth) coverage defender.
  + 28 Lock: Cover 28 but with one corner in man
* Cover 3: A zone coverage with a single-high safety
  + 3 Lock: Cover 3 but with one corner in man
  + Cover 33: “Three under, three deep.” Cover 3 but with only six defenders.
  + Cover 33 Lock: Cover 33 but with one corner in man
  + Cover 38: Cover 3 but with an extra (eighth) coverage defender
  + 38 Lock: Cover 3 but with an extra (eighth) coverage defender
  + 38 Man: Cover 1 but with 8 coverage defenders (both corners in man)
* Cover 4: A zone coverage with two high safeties and high, zone corners who play deep quarters.
  + 4 Lock (aka “4 Key”): Cover 4 but with one corner in man
  + Cover 24: “Two under, four deep” Cover 4 but with only six coverage defenders
  + Cover 24 Lock: Cover 24 but with one corner in man (remaining DBs play deep quarter, quarter, half)
  + Cover 48: Cover 4 but with an extra (eighth) coverage defender
  + Cover 48 Lock: Cover 48 with one corner in man
* Cover 5: “Man under, 2 deep.” Both corners play man, with 2 high safeties in zone.
* Cover 6: Zone coverage with both corners in zone and 2 high safeties playing zone. One corner is shallow playing the flat (Cover 2 side), the other plays a deep quarter (Cover 4 side)
  + Cover 66: Cover 6 but with only six coverage defenders
  + Cover 68: Cover 6 but with an extra (eighth) coverage defender

Top Players by Position



