WINNOWING THE FIELD: CONTINUITIES AND CHANGES IN THE 2020
PRESIDENTIAL PRIMARY

AN HONORS THESIS
SUBMITTED ON THE THIRD DAY OF MAY, 2021
TO THE DEPARTMENT OF POLITICAL SCIENCE
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
OF THE HONORS PROGRAM
OF NEWCOMB-TULANE COLLEGE
TULANE UNIVERSITY
FOR THE DEGREE OF
BACHELOR OF ARTS
WITH HONORS IN POLITICAL SCIENCE

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(Professor Brian Brox, Political Science)

United States presidential nomination and primary races are one of the most politically dynamic processes in American politics with persisting and evolving elements over the course of history. Utilizing a duration model adopted from previous political science studies, this thesis examines the role of winnowing in the 2020 Democratic presidential primary. This model evaluates three factors on how they contribute to a candidate’s decision to withdraw: media coverage, campaign finance receipts, and competitive distance from the frontrunner. Regression results from both a standard Weibull model and a modified Weibull duration model corrected for non-proportional hazards yielded significant findings. These findings suggest that media coverage, campaign finance receipts, and competitive distance remain salient factors influencing a candidate’s decision to exit from the race. However, the relationship of these effects is altered from previous findings of earlier races, suggesting a shift in campaign dynamics.
ACKNOWLEDGEMENTS

This thesis has been an incredibly rewarding process at the culmination of my academic career that would not have been possible without the support of a variety of individuals.

I would like to extend my deepest appreciation to my thesis director, Dr. Brian Brox, for his guidance, mentorship, and patience. In addition, I would like to thank Drs. Oliveros and Bankston for so graciously agreeing to serve on my thesis committee. I would also like to thank Drs. Audrey Haynes, Paul Henri-Gurian, Michael Crespin, and Christopher Zorn for writing the original paper that provided the foundation for my work and for so graciously providing me with a copy of their original dataset.

Next, I would like to thank my fellow thesis writers—Carrigan, Emily, and Claire—for providing unwavering support, motivation, and inspiration throughout this process. Finally, I would like to thank my wonderful family and friends who have instilled confidence in me throughout this process and my entire Tulane academic career.
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INTRODUCTION

Winnowing, first identified by Donald Matthews in 1978, is the process by which candidates in a presidential primary withdraw from the campaign as their chances of winning the nomination narrow and the costs of running outweigh the benefits. The 2020 Democratic primaries stood out for the especially crowded field that lasted throughout both the pre-primary and formal primary season. Over the course of the cycle, 29 serious candidates had campaigns for office, and the process of winnowing was significantly delayed for such a large field. While each primary campaign cycle is unique in both the political context and the makeup and number of candidates, understanding when candidates suspend their campaigns and why they do so links the importance of individual campaign context to the broader structure of primaries and electoral politics.

While many scholars focus presidential primary research on nomination outcomes, less research has been attributed to the reasons or dynamics in which candidates drop out of the race. This thesis thus addresses the following question: what factors explain the timing of candidates withdrawing from the 2020 Democratic primaries and how does that fit into previous models of candidate winnowing? Derived from prior research, three potentially significant influences will be examined: media coverage, campaign finance, and competitive distance.

I will be adapting the Weibull duration model used in Haynes et al. (2004) to data in the 2020 Democratic presidential primary election, thus providing a measure of what factors increase the likelihood of a candidate withdrawing from the race. Duration models provide a dynamic measure of changing values over time and allow for the inclusion of censored cases, or events that don’t happen in the scope of the model such as the nominee.
dropping out (Norrander 2006, 496). The Weibull duration model is a parametric model that allows for the inclusion of covariates of survival times that may influence event occurrence (Box-Steffensmeier and Jones 1997). Two decades after the 2000 presidential primary election on which Haynes et al. (2004) modeled their duration model, I will seek to understand what factors have persisted and changed over time.

This thesis is divided into five chapters. First, the literature review chapter presents a summary of the scholarly literature on presidential nomination politics that form the framework for my research. Next, the data and methodology chapter reviews the creation of my duration dataset as well as a description of the duration model. The results and discussion chapter presents the findings from the duration model. Finally, the concluding chapter discusses the findings and details implications for future presidential primary elections.
LITERATURE REVIEW

This chapter reviews relevant literature crucial to understanding the politics of presidential nominations and further the insights into presidential candidate withdrawal. This literature review focuses on describing the intellectual development of models of post-reform presidential nomination scholarship in addition to identifying factors that shape campaign dynamics and a candidate’s decision to exit from active campaigning.

Brief History of Presidential Nominations

The intra-party nature and structure of sequential contests via primaries and caucuses gives presidential nominations in the United States a unique political character (Aldrich 1980a; Bartels 1988). However, the nomination system has not always been structured in this way. Presidential nominees of political parties were initially selected by caucus party members of Congress and were internal affairs for party elite. Then, in the 1830s, party conventions developed in which elite party members would congregate prior to the general election to nominate a candidate to run for office from their party. The first use of primaries was in 1912, sparked by the Progressive Era reforms that aimed to make the process more public (Norrander 2020).

Most primaries prior to 1968 existed in a few states and functioned as ‘beauty contests’ because the delegates awarded from that state were not bound to a certain candidate and thus the electoral contest only functioned to signal viability and electability to party elites. The real contest came in the form of negotiations at the party convention amongst elites and party leaders (Kamarck 2016). Candidates entered primaries in certain states strategically based on perceived chances of winning to avoid negative perceptions associated with doing poorly in a state (Aldrich 1980a).
This system of party dominated presidential nomination selection concluded with the establishment of the McGovern-Fraser Commission following the 1968 Democratic Party Convention. The reforms established by the Commission called for publicly open nominating contests either through local caucuses or primary elections in which delegates won by candidates were bound at the party convention (Kamarck 2016). These internal Democratic reforms have also translated to be the standard process for Republicans. Since 1968, the United States has been in what is considered to be the post-reform era of presidential nominations, in which primary election contests largely determine the party candidate. As a result of the reform, primaries grew in importance and participation and more states eventually switched from caucuses to binding primaries to select delegates (Kamarck 2016). Only four states—Iowa, Nevada, North Dakota, and Wyoming—and a handful of American territories had caucuses still in place for the 2020 primaries.

**Momentum Model**

Following the 1976 Jimmy Carter and the 1984 Gary Hart victories, both of which mobilized resources from early wins to propel candidates to victory, momentum emerged as a major presidential nomination phenomenon (Aldrich 1980a; Bartels 1988). Momentum is a campaign resource that advances a campaign through electoral competitions and can be generated either by winning or just doing better than expected (Aldrich 1980a; Bartels 1988). Momentum is cyclical in nature in that it is self-perpetuating and positively benefits campaign resources in an interlocking manner. For example, early success might generate more media coverage which could increase candidate support, generating more campaign donations which generates more support and more media coverage, and so forth. One scholar described the substantial effects
momentum will have on a candidate field by stating, “once the competitive balance is substantially tipped, candidates with momentum have an increasing probability of attaining the nomination, while candidates whose chances begin to decline substantially will see them continue to decline until they are forced to retire from active competition” (Aldrich 1980a, 135).

Most conceptualizations of momentum focus on it as a strategy for voter decision making. Bartels (1988) contends that there are four psychological aspects of momentum for voters—strategic voting, cue-taking, contagion, and supporting winners—that interact simultaneously (108–118). In short, voters learn in sequential primary elections by updating their candidate preferences with new knowledge of likelihoods of certain candidates winning based on previous results. Bartels (1988) contends that including information about viability is essential to predicting the dynamics of the primary. Similarly, Abramowitz (1989) finds that momentum changes perceptions of viability and electability.¹

Momentum is dynamic in that it does not affect the time-period of the primary or candidates in the primary evenly. Bartels (1988) argues that momentum is more important for lesser-known candidates and at the beginning of the campaign due to increased uncertainty with the lack of delegate counts. Norrander (1993) argues that momentum is primarily a factor for candidates who emerged as the main challenger to the nominee rather than a determinant of the nominee. Momentum also doesn’t seem to affect all elections evenly, mattering the most in campaigns that are characterized as

¹ In the context of presidential primaries, viability is the perceived chances for a candidate to win the party’s nomination and electability is the perceived chances of a candidate winning in the general election.
having one major candidate and less so in two major candidate campaigns or no major
candidate campaigns (Bartels 1988, 171).

However, more recent research has indicated that momentum may not have the
same power that it used to have. Norrander theorizes that the fall of momentum is due to
front-loading, or the movement of races earlier and earlier to the beginning of the primary
season (Norrander 2000, 1000). In addition, one recent study on the 2016 presidential
primaries analyzed over 325,000 interviews with voters and found no support for the
momentum model—respondents did not substantially update candidate preferences
according to results from primary (Clinton, Engelhardt, and Trussler 2019).

**Forecasting Literature**

A more recent addition to the literature has been in the form of forecasting models
that predict winners. Presidential nomination races have considerably less predictability
than general election campaigns due to multi-candidate fields, lack of party identification
as a proxy for voter decision making, and sequential elections. Nonetheless, Mayer
(1996) contends that regularities of post-reform campaigns such as the power of money,
the resilience of front runners, and the perils of long-shot candidates provide a certain
degree of consistency and predictability. Forecasting is a campaign dynamic model in
that it focuses on campaign activity rather than voter choice as with the majority of
momentum models.

In contrast to momentum approaches, forecasting research by nature focuses on
factors and resources available in the pre-primary season. The pre-primary season or
‘invisible primary’ are the months and years prior to the Iowa caucus in which candidates
are establishing their campaigns, resource pools, name recognition, and public support.
Scholars have found that both tangible and intangible resources such as name recognition gained in the invisible primary are critical to forecasting the primary election winner and losers (Cohen et al. 2008; Steger 2007). While forecasting literature is helpful to understand which candidates are likely to emerge as the front-runner and winner, it lacks the ability to describe how campaign dynamics influence the actual structure of the race.

**Winnowing Model**

Winnowing has emerged as a recent focus of presidential nomination scholars (Damore, Hansford, and Barghothi 2010; Haynes et al. 2004; Norrander 2000, 2006; Steger, Hickman, and Yohn 2002). This field of scholarship is unique in that it provides a dynamic understanding of how the same factors that lead a candidate to successfully win the nomination also influence their competitors’ decisions to drop out of the race. Winnowing also provides a more thorough picture of the political forces involved in shaping a race, rather than just focusing on the candidate who is able to last the longest and receive the nomination.

Scholars postulate that when the drawbacks of remaining in a race outweigh the benefits, candidates suspend their campaign (Norrander 2006). Steger, Hickman, and Yohn (2002) analyze candidate competition and winnowing from 1912-2000 and find that while winnowing has remained a constant factor, the nature of such winnowing has dramatically changed. The authors state that winnowing is more likely in the post-reform era, because scarcity of resources such as media attention and votes with more candidates competing in every primary necessitates field reduction (Steger, Hickman, and Yohn 2002). Similarly, Norrander (2000; 2006) contends that presidential nominations in the post-reform era are best characterized as a game of attrition, or the winner being the
candidate who can survive the longest. Given these strengths of a winnowing model along with the previously discussed drawbacks of momentum and forecasting models, a winnowing model is employed for the purpose of this study on the 2020 presidential primaries. One study in particular, “The Calculus of Concession” by Haynes et al. (2004), will serve as the inspiration behind the survival analysis model I create for the 2020 presidential primary race. Their model of the 2000 Republican presidential primary race focused on the inclusion of three covariates: media coverage, competitive distance, and average daily receipts.

**Factors Influencing Candidate Withdrawal**

*Candidate Classification & Field Size*

While all candidates likely enter a race with the hope of winning the nomination and the presidency, not all candidates have the same motivation for remaining in a race. Whereas it is less important for primary forecasting literature, in which the focus is on the ultimate winner, winnowing research requires a more comprehensive view of the field and understanding of campaign motivations and dynamics. The motivations to enter a race become the basis of the motivations to remain in a race, which informs the reasons and timeline of exiting from a race (Damore, Hansford, and Barghothi 2010). One way in which scholars have theorized these divergent motivations is through candidate classifications. By categorizing candidates into smaller sub-categories, analyses are able to better describe how a certain type of candidate will react to a set of conditions.

Aldrich (1980a) characterizes candidates’ goals into four categories focusing on motivations to enter a race: office seeking, policy seeking, campaign benefits, and/or position boosting. Similarly, Steger, Dowdle, and Adkins (2004) classify candidates as
career strategist or advocates. Advocacy candidates stay in the race longer than other candidates in an attempt to promote one’s policy agenda (Steger, Dowdle, and Adkins 2004; Norrander 2006). Another classification is with competitive evaluations of big shot versus long shot candidates (Haynes et al. 2004). With all classification conventions, the primary hurdle is in creating empirical classification methodology as candidates rarely neatly fall into a single categorization.

Aldrich (1980a; 1980b) found that a primary field with a large number of candidates is inherently unstable and tends to winnow more rapidly than one with only a few candidates. This theory was supported in a simulation experiment that found complete unpredictability with multicandidate fields (Cooper and Munger 2000). Additionally, a recent analysis found that Democratic primary campaigns are systematically more likely to lead to longer and more divisive races since the winner-takes-all rules that are common in Republicans contests disproportionately benefit winners, encouraging early drop out and support coalescing around the frontrunner (Ryan 2018).

**Primary Calendar**

Primaries are held sequentially with the earlier contests having a disproportionate impact on the race. The first month of primaries is made up of four contests: the Iowa caucuses, New Hampshire primary, Nevada caucuses, followed by the South Carolina primary. Then comes ‘Super Tuesday’—the Tuesday in which the most states hold a primary contest and nearly one-third of all delegates were won in 2020—about a month after the Iowa caucuses. This convention is a result of frontloading in which states have moved up the primaries earlier and earlier in an election year to have more influence on
the process, leaving little time in-between sequential elections. As a result, the four races prior to Super Tuesday seem to operate as a practice round of sorts in which relatively few delegates are awarded—only 4% were allocated in 2020—but the public is able to witness viability.

Scholarly research has focused on analyzing the impact of Iowa caucus and New Hampshire primary results, as these first two races have had a disproportionate impact on candidates, especially through media coverage. Steger, Dowdle, and Adkins (2004) found that New Hampshire had a significant effect on Democratic races. One winnowing study found that placing first in the New Hampshire primary led to a candidate lasting 61% longer than candidates who received the average vote (Norrander 2006, 504). Given the complexities of caucuses, Iowa results have less of a significant impact than that of New Hampshire (Adkins and Dowdle 2001).

Although the pre-primary period is critical for forecasting literature, not all models have focused on both the primary and pre-primary period for winnowing literature. While pre-primary data were not included in the authors’ duration model, Damore, Hansford, and Barghothi (2010), found that time-varying variables had significant effects on duration and thus those aspects which happen after the Iowa caucuses are most critical. Norrander (2006) analyzes candidate attrition during the primary period and finds that candidates with limited initial assets or poor standings in early races leave the nomination process more quickly. One complicating factor is that in terms of survival, the pre-primary period and official primary period have distinct competitive conditions and calculations.
Competitive Distance

Competitiveness considers a candidate’s public support in relation to other candidates. Intuitively, information regarding competitiveness in the race factor into campaign strategy. Candidates who have a higher percentage of public support either through delegates or polling data have a different calculus than candidates with lower levels. Front-runners, that is candidates who have emerged as leaders in polling and then are facilitated through media narratives, have a significant and durable advantage in presidential nominations (Feigenbaum and Shelton 2013). Candidates are more likely to exit a race the further they get from the front-runner in polls or election races (Norrander 2000). Thus, I develop my first hypothesis ($H_{1a}$): *Increased competitive distance from the frontrunner increases the likelihood of dropping out from a presidential primary.* In other words, candidates who are doing poorly in relation to the frontrunner are more likely to withdraw from the race. Furthermore, I argue that competitive distance is time dependent, meaning that it doesn’t influence candidate withdrawal calculations evenly throughout both the pre-primary and primary period. More specifically, ($H_{1b}$) *the effect of competitive distance on withdrawal likelihood increases over time.* While early polling results and delegate counts are viewed with less certainty of being the final vote total due to additional time and opportunities for candidates to make up for distance in polling and delegate counts, later results become more salient due to the decreased chances of competitive distance movement.

In contrast to the dominant momentum theory, Strumpf (2002) discusses a countervailing force in that a candidate who is trailing behind in initial contests may remain in the race if they are expected to do well in later contests. This force thus favors
later winners rather than momentum which favors early winners. Damore, Hansford, and Barghothi (2010) find that the decision to withdraw from the race is affected by a candidate’s status in their party, their assessments of competitiveness, and their motivations to either win the nomination or raise their political profile.

Campaign Finance

In order to remain in the race, candidates must have enough financial resources to sustain their campaign. Financial resources not only provide candidates with monetary resources to pay for staff salaries, advertising, and campaign supplies, but also act as a signal of the level of public support a candidate has. Aldrich (1980a) characterizes money as a “replenishable resource” in that if spending campaign money increases chance of electoral success, it will increase the ability to fundraise money (71). Feigenbaum and Shelton (2013) describe campaign fundraising and perceived viability as a vicious cycle and find significant bidirectional feedback. However, Haynes et al. (2004) find that while the role of money is important in the calculus of candidate exit, it depends on a candidate’s competitive position in the race and having adequate campaign resources is not enough to remain in a race on its own.

Assessing the classic role of campaign finance effects, my second hypothesis ($H_{2a}$) is increased average daily receipts decreases the likelihood of dropping out from a presidential primary. Thus, candidates with greater financial resources are less likely to withdraw from the race as they are able to financially sustain the campaign. In regard to the time dependence of this effect, I develop an extension of my hypothesis ($H_{2b}$): the effect of average daily receipts on withdrawal likelihood decreases over time. This hypothesis is derived from Haynes et al. (2004) who found the effect of average receipts...
to decrease over the course of the campaign. This is largely due to the function of campaign receipts mattering most in the early stages of the campaign when funds are being generated and stored as cash reserves to sustain the entire candidacy.

*Media Coverage*

Media is another element of candidate winnowing as it helps shape narratives around candidate viability and impacts candidate support, familiarity, and fundraising. Matthews (1978) provides an overview of conventional wisdom in the field of American politics about the media’s role in winnowing out candidates in a presidential primary field. Additionally, he introduces the idea that media effects have a larger impact earlier in the race when candidates are less known to the public. Shen (2008) finds that the frequency of media coverage had a significant effect on candidate duration on 1980-2004 presidential primaries.

Some research has focused on not only the quantity of media coverage, but the quality and tone of such coverage and specifically the degree of horse race coverage. Horse race coverage is media coverage that focuses on describing who is gaining or losing ground in the polls or in races. Haynes et al. (2004) analyzes horse race coverage and determines that media coverage is more important to long-shot candidates early in the race than it is for big-shot candidates later on in the race. That being said, front-runners tend to receive disproportionately more media coverage (Shen 2008). Horse race coverage also has implications for campaign donation patterns as coverage around who is winning signals to donors and voters that a candidate is viable and leads to strategic giving (Mutz 1995). In addition, free media, such as press coverage, allows money to be less salient for certain candidates (Haynes et al. 2004, 312).
In contradiction to previous findings (Haynes et al. 2004; Norrander 2006), Damore, Hansford, and Barghothi (2010) find that cash on hand and media coverage do not directly influence a candidate’s duration in the primary. Additionally, they find that candidates with significant name recognition or who have held major office before are more likely to drop out and relate this to ties to the party establishment (Damore, Hansford, and Barghothi 2010). In maintaining a losing campaign, high profile candidates benefit less from the profile-raising functions of primaries and have increased costs associated with damaging their public reputation and relationships with party elites providing pressure to withdraw for the party’s interests.

Given previous findings on the role of media coverage, I arrive at my third hypothesis ($H_{3a}$): higher levels of media coverage decrease the likelihood of dropping out from a presidential primary. In short, media coverage increases perceptions of candidate viability by providing legitimacy through name recognition. Additionally, media coverage serves as a free advertisement of sorts for candidate to highlight their platforms and campaign message. Like competitive distance and average receipts, I believe that media coverage has a dynamic role throughout the course of the race and thus hypothesize ($H_{3b}$) that the effect of media coverage on withdrawal likelihood decreases over time. Media coverage matters the most early in the race when candidates are establishing name recognition, but as more information becomes available to voters this effect of media matters less to candidates in their calculus of candidate exit.

**Summary**

Two important themes arise from the studies discussed in this chapter: presidential primaries are dynamic and complex events, and voting behavior, elite
behavior, and campaign dynamics all help influence or are influenced by factors such as money, media, public support, and political calculations, although these matter to different degrees in different contexts and years. Thus far I have arrived at the following six hypotheses:

- $H_{1a}$: Increased competitive distance from the frontrunner increases the likelihood of dropping out from a presidential primary.
- $H_{1b}$: The effect of competitive distance on withdrawal likelihood increases over time.
- $H_{2a}$: Increased average daily receipts decrease the likelihood of dropping out from a presidential primary.
- $H_{2b}$: The effect of average daily receipts on withdrawal likelihood decreases over time.
- $H_{3a}$: Higher levels of media coverage decrease the likelihood of dropping out from a presidential primary.
- $H_{3b}$: The effect of media coverage on withdrawal likelihood decreases over time.

In addition to these hypotheses, I propose one final hypothesis:

- $H_{4}$: The likelihood of dropping out of a presidential primary increases as the campaign progresses.

By definition, all candidates except for one will have to exit the nomination race so as time progresses, you get closer to that point. Additionally, candidates who gather enough resources to sustain their campaigns are incentivized to remain in the race for at least a few months to determine how the public reacts to their candidacy and how future opportunities such as upcoming debates boost their candidacy. As uncertainty reduces
over the course of the campaign and it becomes clear that the likelihood of potential success is slim, candidates are more likely to withdraw from the race.

Over the past decades, there have been fewer contributions to the presidential primary literature despite relatively dynamic contests and a potentially altered landscape with the rise of small dollar donations, front-loading primaries or caucuses, and the increased length, importance, and scope of the pre-primary process. In addition, a significant amount of literature focuses on predicting the eventual nominee, while less focuses on winnowing. As described in the introduction chapter, the multi-candidate nature of the 2020 Democratic primaries serves as a useful case study to advance winnowing literature in particular and presidential primary literature in general.
DATA & METHODOLOGY

In order to study the 2020 primaries and test the hypotheses proposed, I assembled a dataset from a variety of sources. The methodological setup of the dataset is modeled off of that employed by Haynes et al. (2004). In this chapter, I provide a rationale for and describe the inclusion criteria used in my analysis of eleven candidates. Then, I elaborate on the dependent variable of candidate duration and define the time period of analysis. Next, I operationalize the three independent variables of interest—media coverage, competitive distance, and average daily receipts—and report summary statistics of my dataset. Finally, I conclude the chapter with an overview of the duration model employed with results provided in the following chapter.

Case selection

In the 2020 presidential primary, over two dozen ‘serious’ candidates entered the primary field. Not all candidates enter presidential primaries with the sole goal of becoming their party’s nominee and running to become the President. As noted above, this is especially true of candidates who fail to gain popular support and thus remain in a campaign for other benefits from the race including national profile raising and issue advocacy (Steger, Dowdle, and Adkins 2004). While I acknowledge that these non-competitive candidates are of interest, they are outside of the scope of this analysis. My focus is on candidates who have at least some plausible chance of winning the nomination. As such, only candidates who reached a FiveThirtyEight polling average in the single digits for at least one day in my period of analysis were included in my dataset.

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2 Conceptions of serious candidates who warrant media attention vary, although a combination of being a prior or former high office-holder, and having substantial fundraising levels, and the level of media attention are usually included.
This narrows the field from dozens of candidates down to thirteen: Joseph R. Biden, Michael Bloomberg, Cory Booker, Pete Buttigieg, Julián Castro, Tulsi Gabbard, Kamala Harris, Amy Klobuchar, Beto O’Rourke, Bernie Sanders, Tom Steyer, Elizabeth Warren, and Andrew Yang. Additionally, all thirteen of these candidates qualified for multiple of the twelve democratic debates, which marks the beginning of my analysis and provides candidates with national attention in order to remain viable.

Two of these thirteen candidates stand out as distinct: Steyer and Bloomberg. Both of these candidates are billionaire businessmen who self-funded their campaigns and far surpassed previous records. Bloomberg did not accept campaign contributions and thus was entirely self-funded, contributing and spending over $1 billion, more than any candidate in history. Steyer spent more than $340 million on his presidential bid—over twice that of the next highest fundraiser, Sanders. This is further displayed in table 2 which reports mean values of average daily receipts with Bloomberg having a mean of $8.7 million and Steyer having a mean of $3 million, far outpacing receipts for other candidates. However, both Steyer and Bloomberg are idiosyncratic and not representative of the sample that I am aiming to describe and analyze. Not only were their campaign funds a complete outlier, but their presence as self-financing billionaires potentially changes the motivations and calculations behind campaign entry and withdrawal. This point is further demonstrated in the following chapter in which models that included and excluded Bloomberg and Steyer are directly compared.

Another operational decision I am making is that I am not stratifying candidates according to various categories such as big shot vs. long shots (Haynes et al. 2004), traditional candidates vs. non-traditional candidates (Norrander 2006), or strategic
candidates vs. advocacy candidates (Steger, Dowdle, and Adkins 2004). While useful distinctions can be made by these stratifications, many of those distinctions are not possible in my reduced dataset of competitive candidates.

**Dependent Variable**

The dependent variable of interest is the duration of candidacy in days from June 26, 2019, the date of the first primary debate. As the pre-primary period becomes more and more difficult to define and as it starts earlier and earlier, the date of the first debates is a clear entry point for formal campaigning on a national stage. That being said, two candidates in our study entered the primary after the first debate with Michael Bloomberg entering on November 21, 2019 and Tom Steyer entering on July 16, 2019. For these two candidates, duration was instead calculated from their date of entry. The end point of duration is defined as the date that each candidate announced their withdrawal from the primary, except for Biden who never withdrew as he received the nomination. Table 1 summarizes entry and exit information during the 2020 Democratic primary for the thirteen candidates present in our analysis.

*For Bloomberg, the exploratory committee date of November 21, 2019 is used instead for calculation duration. For Steyer, the date of entry, July 16, 2019 is used instead for duration calculation.

<table>
<thead>
<tr>
<th>Candidate</th>
<th>Entry date</th>
<th>Exit date</th>
<th>Duration in days from June 26, 2019*</th>
</tr>
</thead>
<tbody>
<tr>
<td>O'Rourke</td>
<td>March 14, 2019</td>
<td>November 1, 2019</td>
<td>128</td>
</tr>
<tr>
<td>Harris</td>
<td>March 4, 2019</td>
<td>December 3, 2019</td>
<td>160</td>
</tr>
<tr>
<td>Castro</td>
<td>January 12, 2019</td>
<td>January 2, 2020</td>
<td>190</td>
</tr>
<tr>
<td>Booker</td>
<td>February 1, 2019</td>
<td>January 13, 2020</td>
<td>201</td>
</tr>
<tr>
<td>Yang</td>
<td>November 6, 2017</td>
<td>February 11, 2020</td>
<td>230</td>
</tr>
<tr>
<td>Steyer</td>
<td>July 16, 2019</td>
<td>February 29, 2020</td>
<td>229</td>
</tr>
<tr>
<td>Buttigieg</td>
<td>April 14, 2019</td>
<td>March 1, 2020</td>
<td>249</td>
</tr>
<tr>
<td>Klobuchar</td>
<td>February 10, 2019</td>
<td>March 2, 2020</td>
<td>250</td>
</tr>
<tr>
<td>Bloomberg</td>
<td>November 21, 2019</td>
<td>March 4, 2020</td>
<td>104</td>
</tr>
<tr>
<td>Warren</td>
<td>February 9, 2019</td>
<td>March 5, 2020</td>
<td>253</td>
</tr>
<tr>
<td>Gabbard</td>
<td>January 11, 2019</td>
<td>March 19, 2020</td>
<td>267</td>
</tr>
<tr>
<td>Sanders</td>
<td>February 19, 2019</td>
<td>April 8, 2020</td>
<td>287</td>
</tr>
<tr>
<td>Biden</td>
<td>April 25, 2019</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
The dataset is constructed by creating a daily entry for each candidate with daily records of the covariates described in the follow sections and a binary indicator variable that is coded as a “0” when a candidate remains in the race or a “1” when a candidate announces their exit from a race. After exit, each subject is removed from the dataset and analysis. Since Biden never withdrew from the race, he is “right censored,” meaning that while his records end, the duration model doesn’t treat his case in the same way that he would for candidates who experienced a withdrawal.

**Independent Variables**

*Competitive distance* is the relative distance from the front-runner candidate in a presidential primary and is made up of two measurements, *polling distance* and *delegate distance*. The construction of these variables was adapted from Haynes et al. (2004). Throughout both the pre-primary and primary season, national polls are conducted by a variety of polling outlets and provide an indication of a candidate’s level of popular support and viability. These polls not only provide information to voters who are seeking to support viable candidates who have a chance of winning, but they also provide information to campaigns who align their campaign strategy, including whether to remain in a race or drop out, with competitive distance. For the measurement of *polling distance*, I took national polling averages from *FiveThirtyEight’s Presidential Primary Polling Averages 2020* dataset. Polling aggregates increase the sample size, therefore increasing the precision of results (Jackson 2018, 628). In addition, *Five Thirty Eight’s* polling averages were weighted and adjusted based on recency and pollster rating.\(^3\) Next, each

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\(^3\) For more details on polling average methodology, see https://fivethirtyeight.com/features/what-makes-our-new-2020-democratic-primary-polling-averages-different/
candidate’s polling percentage was subtracted from that of the candidate who achieved the maximum on any given day, creating the measurement of *polling distance*.

However, once the primaries begin campaigns also incorporate information on delegate counts to assess their outlook. To replicate the information that campaigns are receiving day-to-day, delegate counts were obtained from daily web archives of the *New York Times* primary results page, which was updated with delegate reallocations as candidates dropped out. The measurement of *delegate distance* was calculated from calculating the fraction of delegates a candidate received over the total delegates available at any given day and then subtracting that from that of the candidate with the most delegates at any given time. Thus, the final variable of *competitive distance* is made up of *polling distance* until February 6, 2020 when *delegate distance* and *polling distance* were averaged. ⁴

Candidates can only remain in a race for as long as they can finance a campaign, and as such, the next variable of interest in the model is *average daily receipts*. Since cash on hand data is only reported at a monthly or quarterly basis, campaign contributions provide a better day-by-day picture of the state of candidate campaign finance. Receipts were compiled according to the procedure used by Haynes et al. (2004). As such, full monthly and/or quarterly reports were downloaded from the Federal Election Commission for each candidate for the duration of analysis. Each report was then cleaned and aggregated into cumulative daily records of individual contributions from schedule 17A. For Steyer and Bloomberg, who self-funded over 98% of their

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⁴ Given significant mistakes and delays in the release of Iowa’s caucus results, the delegate averaging began on February 6, 2021 (three days after the caucuses) as delegate counts were not available previously or were contested across outlets.
campaigns, 17D receipts were used instead. Finally, a 7-day moving average of these daily receipts were taken for each candidate to account for daily contribution fluctuations, creating the variable *average daily receipts*.

The final variable of interest is *media coverage* which was compiled from the GDELT 2020 Election dashboard with data from the Internet Archive's Television News Archive processed by the GDELT Project—an open-access database that monitors global news media. The data provided is daily chyron screen time, or the number of minutes each candidate was mentioned in onscreen chyron text each day for 24/7 news coverage on three channels: CNN, MSNBC, and Fox News. While Haynes et al. (2004) focused on horserace coverage in their model and thus analyzed news coverage for sentiment analysis, my focus is rather on media coverage simply serving as a proxy for public attention. Table 2 presents summary statistics for each candidate with the independent variables *media coverage, competitive distance, and average daily receipts*. 
<table>
<thead>
<tr>
<th>Candidate</th>
<th>Media Coverage</th>
<th>Competitive Distance</th>
<th>Average Daily Receipts</th>
</tr>
</thead>
<tbody>
<tr>
<td>O’Rourke (T = 128)</td>
<td>7.43 (16.09)</td>
<td>24.87 (1.12)</td>
<td>26,769 (14,247)</td>
</tr>
<tr>
<td>Harris (T = 160)</td>
<td>6.42 (12.86)</td>
<td>19.72 (3.51)</td>
<td>69,959 (50,595)</td>
</tr>
<tr>
<td>Castro (T = 190)</td>
<td>4.46 (12.31)</td>
<td>26.14 (1.05)</td>
<td>11,661 (6,642)</td>
</tr>
<tr>
<td>Booker (T = 201)</td>
<td>6.02 (11.12)</td>
<td>25.23 (0.89)</td>
<td>73,436 (111,978)</td>
</tr>
<tr>
<td>Steyer (T = 229)</td>
<td>3.30 (6.99)</td>
<td>26.39 (1.95)</td>
<td>3,043,883 (4,261,359)</td>
</tr>
<tr>
<td>Yang (T = 230)</td>
<td>2.78 (5.52)</td>
<td>24.44 (1.37)</td>
<td>156,547 (268,033)</td>
</tr>
<tr>
<td>Buttigieg (T = 249)</td>
<td>11.20 (20.53)</td>
<td>19.52 (3.96)</td>
<td>165,812 (89,118)</td>
</tr>
<tr>
<td>Klobuchar (T = 250)</td>
<td>5.51 (12.82)</td>
<td>25.19 (1.78)</td>
<td>87,374 (125,755)</td>
</tr>
<tr>
<td>Bloomberg (T = 101)</td>
<td>42.07 (73.27)</td>
<td>22.35 (2.45)</td>
<td>7,429,928 (7,679,795)</td>
</tr>
<tr>
<td>Warren (T = 253)</td>
<td>29.31 (35.49)</td>
<td>11.06 (4.66)</td>
<td>159,631 (138,876)</td>
</tr>
<tr>
<td>Gabbard (T = 267)</td>
<td>2.54 (8.44)</td>
<td>27.52 (5.54)</td>
<td>50,140 (104,403)</td>
</tr>
<tr>
<td>Sanders (T = 287)</td>
<td>44.27 (71.08)</td>
<td>9.99 (3.87)</td>
<td>281,086 (307,390)</td>
</tr>
<tr>
<td>Biden (censored at T = 287)</td>
<td>82.13 (85.84)</td>
<td>1.41 (4.61)</td>
<td>246,413 (336,686)</td>
</tr>
</tbody>
</table>

(Minimum, maximum) (0, 590.4) (0, 52.08) (114, 28,300,000)

NOTE: N = 2835. Cell entries are mean daily values; standard deviations are in parentheses.

Survival Analysis Model Specification

To model the impacts of independent variables on the likelihood of political withdrawal I utilize a survival analysis model, also known as a duration model or event history model. Survival analysis is useful for cases in which a discrete event is occurring, such as withdrawing from a political primary (Box-Steffensmeier and Jones 1997). Since gaining prominence in political science over the past few decades, survival analysis has been used in nearly all previous research on winnowing (Haynes et al. 2004; Norrander
2006; Damore, Hansford, and Barghothi 2010). Duration models allow for time-varying covariates with changing values over time, enabling me to directly measure the influence of my three covariates of interest on candidate withdrawal. Another advantage of survival analysis is that it allows for the inclusion of censored cases such as Biden withdrawing from the race (Norrander 2006, 496).

There are several different types of survival models, all falling into three main categories: 1) non-parametric, which does not constrain the function to any shape but does not easily incorporate covariates, 2) semi-parametric models such as the Cox model, which parametrizes the covariates but not the hazard function, and 3) parametric models which constrain the shape of the baseline hazard function to a standard form (Box-Steffensmeier and Jones 1997; Allison 2014). For the purposes of this analysis, a parametric model called the Weibull model is employed. Parametric models are preferred in cases in which the general shape of a distribution is known as it allows for smoothing of data and more intuitive predictions and interpretations of the covariates (Allison 2014). Unlike semi-parametric analysis which only focuses on the values of the covariates immediately leading up to a failure as a matter of efficiency, parametric analysis incorporates time-varying covariate data throughout the entire period of analysis to provide a more complete picture of the duration (Cleves, Gould, and Marchenko 2016, 234).

Adapting the general methodological framework set up by Haynes et al. (2004), a Weibull model is used. Weibull models have a baseline hazard of the form
\[ h_0(t) = pt^{p-1}\exp(\beta_0), \]
in which the scale parameter is parametrized as \( \exp(\beta_0) \), and \( p \) is the shape parameter that describes the function of the hazard function. If \( p = 1 \), then the
hazard is constant and the model reverts to an exponential model. However, when $p < 1$, the hazard is monotone decreasing and when $p > 1$, the hazard is monotone increasing (Cleves, Gould, and Marchenko 2016, 259).
RESULTS & DISCUSSION

The Weibull model is fitted according to the proportional hazard parameterization, which characterizes the model in terms of the baseline hazard rate. Weibull model regressions are reported either in terms of coefficient estimates or hazard ratios which are exponentiated coefficients (Allison 2014, 24). The hazard rate provides the “risk” of a candidate dropping out having survived at any given time. The direction of coefficient estimate describes the relationship of the covariate to the baseline hazard rate. Thus, a positive sign indicates an increase in the hazard of a candidate dropping out and a negative sign indicates a decrease in the hazard of a candidate dropping out. In other words, a positive coefficient estimate indicates that a variable decreases the expected candidacy duration. The magnitudes of coefficient estimates are difficult to interpret given their conditional on the units of measurement. To better contextualize these results, I used the following equation where \( e^{\hat{\beta}_x} \) is the hazard ratio, to calculate the percent change in the hazard for each unit increase in a covariate’s value, holding all other factors stable:

\[
\text{Percent change} = 100 \left[ e^{\hat{\beta}_x} - 1 \right]
\]

As described in the previous chapter, Bloomberg and Steyer are theorized to be outside my typology of candidates and thus I ran a Weibull model both including and excluding them to determine the model’s sensitivity to their inclusion. The results of model 1, which included Bloomberg and Steyer are provided in the first column of table 3 while the results of model 2, which excluded Bloomberg and Steyer are provided in the second column of table 3. All analyses were performed using Stata, version 16.1.
Table 3. Weibull Models of Candidate Exit

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Model 1: Candidates &amp; Bloomberg and Steyer</th>
<th>Model 2: Candidates Without Bloomberg and Steyer</th>
<th>Model 3: Dynamic Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>-21.32***</td>
<td>-26.26***</td>
<td>-100.8***</td>
</tr>
<tr>
<td></td>
<td>(4.099)</td>
<td>(4.790)</td>
<td>(19.35)</td>
</tr>
<tr>
<td>Media coverage</td>
<td>0.010***</td>
<td>0.019***</td>
<td>0.172***</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.033)</td>
</tr>
<tr>
<td>Competitive distance</td>
<td>0.1080***</td>
<td>0.071***</td>
<td>2.837***</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.019)</td>
<td>(0.578)</td>
</tr>
<tr>
<td>Average daily receipts/10,000</td>
<td>0.0004</td>
<td>-0.059**</td>
<td>-0.266</td>
</tr>
<tr>
<td></td>
<td>(0.0003)</td>
<td>(0.019)</td>
<td>(0.494)</td>
</tr>
<tr>
<td>Media coverage × lnT</td>
<td></td>
<td></td>
<td>-0.028***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.006)</td>
</tr>
<tr>
<td>Competitive distance × lnT</td>
<td></td>
<td></td>
<td>-0.502***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.105)</td>
</tr>
<tr>
<td>Average Receipts × lnT</td>
<td></td>
<td></td>
<td>0.037</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.091)</td>
</tr>
<tr>
<td>Number of candidates</td>
<td>13</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Total days at risk</td>
<td>2,835</td>
<td>2,502</td>
<td>2,502</td>
</tr>
<tr>
<td>Shape parameter (p)</td>
<td>3.353</td>
<td>4.497</td>
<td>17.82</td>
</tr>
<tr>
<td></td>
<td>(0.759)</td>
<td>(0.893)</td>
<td>(3.538)</td>
</tr>
<tr>
<td>(\chi^2) (Wald)</td>
<td>77.21***</td>
<td>56.07***</td>
<td>152.1***</td>
</tr>
<tr>
<td>Log pseudolikelihood</td>
<td>7.640</td>
<td>11.59</td>
<td>14.08</td>
</tr>
</tbody>
</table>

NOTE: Cell entries are coefficient estimates with accompanying robust standard errors clustered by candidate in parentheses.

***p < 0.001, **p < 0.01, *p < 0.05

When Bloomberg and Steyer are removed from Model 1 yielding Model 2, the sign and significance of the coefficients remain the same besides that for average daily receipts—which takes on a negative sign at a statistically significant level. In part, this change to a statistically significant result for receipts is due to the vast disparity in receipts that were skewing results. These substantially different results are in contrast to
Haynes et al. (2004, 334n19) who found nearly identical results with the inclusion and exclusion of Forbes, a self-funded candidate. However, the quantity and nature of Forbes’ campaign finance receipts was not nearly as much of an outlier as that of Steyer and Bloomberg whose mean of average daily receipts shown in Table 1 is over ten times and 25 times, respectively that of the next highest raising candidate, Sanders. As such, the focus of my remaining analysis will be on Model 2 and Model 3.

Model 2 Results

The covariate competitive distance has a significant positive effect, meaning that when a candidate’s distance from the frontrunner in polling or delegate counts increase, their hazard rate increases. In other words, candidates with low polling numbers and delegate counts are at a higher likelihood of withdrawing. This is in accordance with $H_{1a}$, which states that increased competitive distance from the frontrunner increases the likelihood of dropping out from a presidential primary. When controlling for all other covariates, each percentage point away from the leading candidate in terms of competitive distance increases the hazard by an estimated 7.31%.

The next variable of interest in this analysis is average receipts. The quantity and pattern of average daily contributions makes an appreciable difference in the prospects of remaining or withdrawing from running in a presidential primary. The significant negative coefficient of 0.0592 translates to a decreased likelihood of candidate exit of 5.75% when an additional $10,000 of receipts are added, controlling for all other covariates. This provides evidence that supports $H_{2a}$, that increased average daily receipts decreases the likelihood of dropping out from a presidential primary.
The final covariate *media coverage* has a positive effect that is significant. The unexpected positive sign indicates that as media coverage increases, the chances of exiting a primary race increase. More specifically, when controlling for other variables each minute of media coverage increases the hazard by an estimated 1.89%. These findings provide evidence that disproves my $H_{3a}$, that higher levels of media coverage decrease the likelihood of dropping out from a presidential primary. However, in some ways this finding is intuitive with understandings of the varying nature of news coverage. Not all news coverage is beneficial and perhaps significant negative news coverage factors into a candidate’s decision to withdraw. I further explain this finding in the dynamic model presented in the next section.

Finally, I test $H_4$: that the likelihood of dropping out of a presidential primary increases as the campaign progresses. This is assessed by analyzing the shape parameter. In both models, the shape parameter ($p$) is greater than 1, meaning that the hazard of a candidate withdrawing from a race increases over time, supporting $H_4$. This is intuitive given our assumptions of the general trajectory of the candidates in the model, in which all candidates lasted at least 100 days before dropping out. This “shape” of withdrawal is visualized in Figure 1, which plots the estimated survival function for model 2.
Figure 1 shows that the average competitive candidate is likely to remain in a primary race at least three months, after which the probability of survival begins to drop. Furthermore, it shows that there are enough resources in the system in terms of both press coverage and campaign finance to support a large competitive multi-candidate field for several months after the beginning of debates. Given that most candidates entered several months prior to the analysis time of origin, June 26, 2019, this conclusion can be also be extended even further back into the pre-primary period.5

Comparing the results of Haynes et al. (2004)’s general model to my model 2, a few similarities and differences emerge. In both models, average receipts has a significant negative effect, and the shape parameter is significant and greater than one. While in my model 2, media coverage and competitive distance have positive significant

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5 See Table 1 for a list of entry dates.
effects, in the Haynes et al. (2004) model, media coverage has an insignificant negative effect and competitive distance has a negative significant effect.

**Dynamic model**

Weibull models have a proportional hazard assumption—the idea that variables have a constant effect over time (Box-Steffensmeier and Zorn 2001). Time dependent covariates—meaning that their effect on the hazard rate depends on duration time—violates the proportional hazard assumption. Since the analysis covers both the pre-primary period, early primary period, and during and after Super Tuesday, it is intuitive that the effects of media coverage, campaign receipts, and competitive distance change throughout the time period in a way that violates the assumption of proportionality. Incorrectly assuming proportionality yields biased estimates of the influence of covariates (Box-Steffensmeier and Zorn 2001).

To correct for non-proportionality, Box-Steffensmeier and Zorn (2001) propose the interaction of covariates with a function of duration, often the natural log of time. This approach was adopted by Haynes et al. (2004) to create a dynamic model that incorporated log-time interactions for the covariates media coverage, competitive distance, and average receipts. They found the covariates media coverage and average receipts to both have positive and significant log-time interaction terms, implying that the effects of these covariates decrease throughout the course of a campaign. They also found the covariate competitive distance to lose significance and found the log-time interaction of competitive distance to yield a positive, though insignificant result.
Interestingly, including these log-time interactions for each covariate in my model yielded conflicting results with that found by Haynes et al. (2004). For one, the significant negative log-time interaction terms for media coverage and competitive distance indicate that the effects of press coverage and competitive distance actually seem to have a greater impact as time increases. Both of these findings support my hypotheses $H_{1b}$ (the effect of competitive distance on withdrawal likelihood increases over time) and $H_{3b}$ (the effect of media coverage on withdrawal likelihood increases over time).

Additionally, while Haynes et al. (2004) found average receipts in their dynamic model to have a positive significant effect, my dynamic model made both average receipts and the log-time interaction term to lose significance. This indicates that the effect of average receipts is not time dependent unlike I hypothesized ($H_{2b}$) and that found by Haynes et al. (2004) who hypothesized that money mattered the most at the beginning of the campaign period.

**Discussion of Results**

**Changing Role of Campaign Finance**

When holding all else equal, candidates with greater average daily receipts are less likely to withdraw from the presidential primary campaign. This result is consistent with that found by previous studies (Haynes et al. 2004; Norrander 2006) and suggest that campaign finance remains a significant factor in campaign strategy. On a very practical level, more money provides candidates with the resources to sustain their candidate. That being said, this finding was only found to be significant when Michael Bloomberg and Tom Steyer were removed from the analysis, suggesting that

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6 See Model 3 in Table 3, p. 326.
idiosyncratic, self-funded outlier candidacies have a separate campaign calculus regarding the decision to remain or withdraw from a race.

While I hypothesized that the effect of average daily receipts on withdrawal likelihood decreases over time, my dynamic model suggests that the effects of average daily receipts on the baseline hazard of withdrawal does not operate in a time-dependent manner. In other words, the effect of average daily receipts does not matter more or less at any given time, instead remaining constant throughout the entire campaign period. One explanation for this finding is that unlike media coverage or competitive distance which operate in distinct ways and serve different purposes during the pre-primary and primary period, average receipts have a consistent function throughout the entire campaign—providing resources to sustain the campaign.

As the finding of time independence contradicts that found by Haynes et al. (2004), I posit that this finding is also partially due to the changing landscape of campaign finance with rising small-dollar donations and viable low-dollar campaign strategies. In a recent working paper, two scholars find that small dollar donations (less than $200) have proliferated in the Democratic Party, making up almost one-third of individual funds in 2018 (Albert and La Raja 2020). They attribute this proliferation to a variety of factors including the Democratic Party’s improved technology through their fundraising platform ActBlue and changing partisan coalitions with greater involvement amongst young people. Furthermore, Albert and La Raja (2020) find that this growth in small dollar donations has benefited less well-known and more ideologically extreme candidates. Greater access to donations provides a wider range of candidates with viability through resource acquisition and grassroot coalition assembly.
**Not all Media is Good Media**

In the dynamic model, the quantity of media coverage is shown to be more important as a campaign goes on as indicated by the significant negative log-time interaction. This finding helps contextualize the positive significant effect of media coverage in model 2 and in the dynamic model which is somewhat counterintuitive. While increased media coverage does increase the likelihood of candidate withdrawal, this effect increases in importance overtime. One potential explanation for this is drawn from a study by Lawrence and Rose (2011) in which they define a phenomenon called ‘exit talk’ as “news coverage and media commentary that discusses whether, when, and how a candidate might end his or her campaign and leave the nominating race” (870). More broadly, the explanation for these findings is likely rooted in the actual sentiment and tone of media coverage. For instance, high levels of negative media coverage are likely to place a candidate at a higher likelihood of withdrawing from the race. However, sentiment analysis of media coverage is recommended for future research to better explain these findings.

**Competitive Calculations are Key**

While Haynes et al. (2004) found competitive distance to have a negative insignificant effect meaning that increased competitive distance leads to lower probabilities of exit—a confusing finding for even the authors—my Model 2 found the opposite with a significant positive effect for competitive distance. Consistent with Norrander (2006) and Damore, Hansford, and Barghothi (2009), the further a candidate is in relation to the frontrunner, the more likely they are to exit from the race. In other words, low polling numbers during the pre-primary period and low polling numbers in
conjunction with the low delegate proportions during the formal primary period have a significant influence in making a candidate more likely to withdraw from a presidential primary.

The importance of competitive distance increases as the campaign progresses, which is intuitive given the dynamics of presidential primary elections. This is also reflected in the understanding of the debate season: as debates progress, polling thresholds are successively raised. Thus, a 3% polling average matters less for the first debate in which 20 candidates participated than when the threshold was raised to 5% or 10%. Additionally, competitive distance matters more as more candidates withdraw over time given that there are fewer candidates diluting polling numbers and popular support. When the primary period begins with Iowa and New Hampshire, fewer delegates are available and the future races like Super Tuesday provide prospects for growth in delegate counts. As more delegates are distributed with successive primaries however, some candidate’s delegate deficiencies become insurmountable and thus are forced to withdraw as they are no longer competitively viable.
CONCLUSION

In conclusion, this thesis provided a case study of the 2020 Democratic primary as a tool to analyze the dynamics behind modern presidential primaries with the focus on candidate withdrawal. The complexity of presidential campaigns is difficult to theorize given the sheer quantity of interlocking factors at play such as field size and ideological composition, the context of national politics, and formal rules including ballot and debate access. Each presidential nomination campaign is politically distinct with a unique blend of factors shaping the makeup and strategy of candidate, thus complicating generalizability. However, the close analysis of the 2020 primary with the adoption of established methods from previous scholarly research is useful to update presidential primary knowledge and scholarship.

My findings suggest that despite the expansion of low budget campaign tools through digital media, campaign finance continues to persist as a central strategic factor regarding campaign strategy, especially in terms of the decision of whether to remain or exit from a race. However, these effects are not time-dependent, unlike that found in previous studies (Haynes et al. 2004), indicating a shift in the nature of campaign finance. Counterintuitively, I also find that increased media coverage increases the chances of candidate withdrawal with this influence the greatest towards the end of the campaign. The 2020 Democratic primary illustrates the ability for the political system to sustain a lengthy, multi-candidate nomination field and as such I do not believe that it will be the last of its type.
Limitations and Extensions

Generalizability is inherently an issue in all single-year case studies of historical processes, especially that of presidential primaries. Only happening every four years with a varying primary calendar, shifting ballot and debate access rules, and a new dynamic field of candidates and national and party politics contexts, presidential primaries are one of the most complex and evolving processes in American politics. Even amongst the historically salient influences of media coverage, campaign finance, and competitive distance, the nature of these relationships to campaign strategy is shaped by evolving processes and dynamics such as the proliferation of social media, rise of small dollar donations, and primary front-loading. In addition to these dynamic influences, the 2020 nomination contest has several distinctive features including the large candidate field with varying relations to the traditional party establishment as well the emergence of the COVID-19 pandemic in the Spring of 2020 (Masket 2020). These features undoubtedly complicate applicability to future years. However, while future races will inevitably carry some similarities to the 2020 primaries and previous presidential primaries, they will also have distinctive elements that shape specific candidate strategies.

No empirical study will be able to fully capture every dynamic involved in the analysis of a process as complex as presidential nomination contests. A potential drawback to the quantitative approach as used in this analysis is that meaningful qualitative data is potentially lost in the analysis. That being said, as primary elections occur every four years with unique factors, a quantitative approach is preferred for applicability to future years. However, one methodological limitation is due to the skew towards failures that occurs in my dataset with all candidates withdrawing except Biden,
a function of the process in question. Using multiple time-varying covariates to estimate a dependent variable that doesn’t vary that much may create problems with estimation of covariance influence. Thus, increasing the precision of estimate of effects requires building in more variance to the dependent variable either through adding a second party into the analysis or analyzing primaries over multiple years. In this case, analyzing multiple primary races allows for more survivals and thus more variance.

Another major limitation of my study was the lack of stratification for candidates according to candidate typology. However, such a broad field of candidates required a narrowed dataset that prevented this classification from occurring. Additionally, I argue that these campaign dynamics are perhaps more difficult than ever to classify and previous classifications fail to conceptualize the nuances at play in this field of primary candidates. The crude distinctions required to classify candidates results in potentially ungeneralizable findings and further refinements are needed to more systematically create classifications and stratifications.

Future research is required to better understand the motivations for candidates who fell outside of my analysis. With Trump, a billionaire who self-funded a decent portion of his 2016 Republic nomination campaign and then went on to win the nomination and the Presidency, self-funded billionaire candidates gained a sense of legitimacy.\footnote{While Trump funded over 50% of his campaign prior to become the presumed nominee, he since switched to largely relying on campaign donations and have paid some of his companies back with campaign donations.} In all likelihood these non-officeholding billionaire candidates are likely to persist in future presidential nomination campaigns and thus future research directions include analyzing this archetype with Bloomberg and Steyer of particular focus. In
addition, future research focus should be placed on candidates who have previously held significant major office experience or received substantial media coverage, but for whatever reason failed to establish competitive viability and thus are outside of my typology.\textsuperscript{8}

Previous studies analyzed the course of several election cycles (Damore, Hansford, and Barghothi 2010; Norrander 2000, 2006; Steger, Hickman, and Yohn 2002), but my analysis is on a single year for a single party. While not a longitudinal analysis, the direct comparison to the 2000 race in Haynes et al. (2004) provides a benchmark to analyze continuities and changes over the past two decades. That being said, given that the latest addition to winnowing research was in 2009 (Damore, Hansford, and Barghothi), future research should not only incorporate future primary races, but also employ multi-year winnowing studies that incorporate the 2012 and 2016 primary races. A greater research focus of presidential primaries in the last two decades will provide more generalizable findings of the changes and continuities that have persisted in the post-nomination era with the opportunity to probe more specific changes such as campaign strategies using social media and the proliferation of small dollar donations.

\textsuperscript{8} Candidates in this category include Michael Bennet, Deval Patrick, John Delaney, Steve Bullock, Joe Sestak, Kirsten Gillibrand, Marianne Williamson, Bill de Blasio, Seth Moulton, Tim Ryan, Jay Inslee, John Hickenlooper, Mike Gravel, Eric Swalwell, Richard Ojeda, and Wayne Messam.
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