

# Replication of: Leader Age, Death, and Political Liberalization in Dictatorships

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## 1 Abstract<sup>1</sup>

Hummel (2020) found that leader deaths rarely result in political liberalization; while personalist and older dictators' deaths are more likely to lead to liberalization, such opportunities are nonetheless modest. With replication data and code provided by Professor Hummel through the Harvard Dataverse, I was able to replicate the findings of the original paper (Hummel, 2019). Given the robustness of the many models created in the Appendix of the original paper, I chose to extend the results by adapting the published figures to a multi-color palette. I suspect that the original paper had restrictions on color due to publication standards, so I took the opportunity to beautify the graphs and model results. Additionally, I checked to make sure that the colors I used were able to be distinguished for various different visual impairments.

## 2 Introduction

In her original paper, Hummel investigates post-death liberalization in authoritarian regimes. While broadly defined, authoritarian regimes can be considered any regime that is not wholly democratic. Liberalization means that an authoritarian regime democratizes. Post-death liberalization is a specific instance of such democratization when it is propelled by the death of a leader. Former literature shows that post-death liberalization is extremely rare, and much less likely than liberalization after other modes of leader removal (Kendall-Taylor & Frantz, 2016). She then asks the following questions: “What [...] explains the empirical

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<sup>1</sup>All materials necessary for this replication can be accessed at my GitHub Repository: [https://github.com/dskinnion/52\\_replication\\_proj](https://github.com/dskinnion/52_replication_proj). Additionally, my sincerest thanks to Professor Hummel for making her code and data so accessible in order to replicate the figures.

rarity of post-death reform? Are there circumstances that make liberalization possible?” (2020, p. 981).

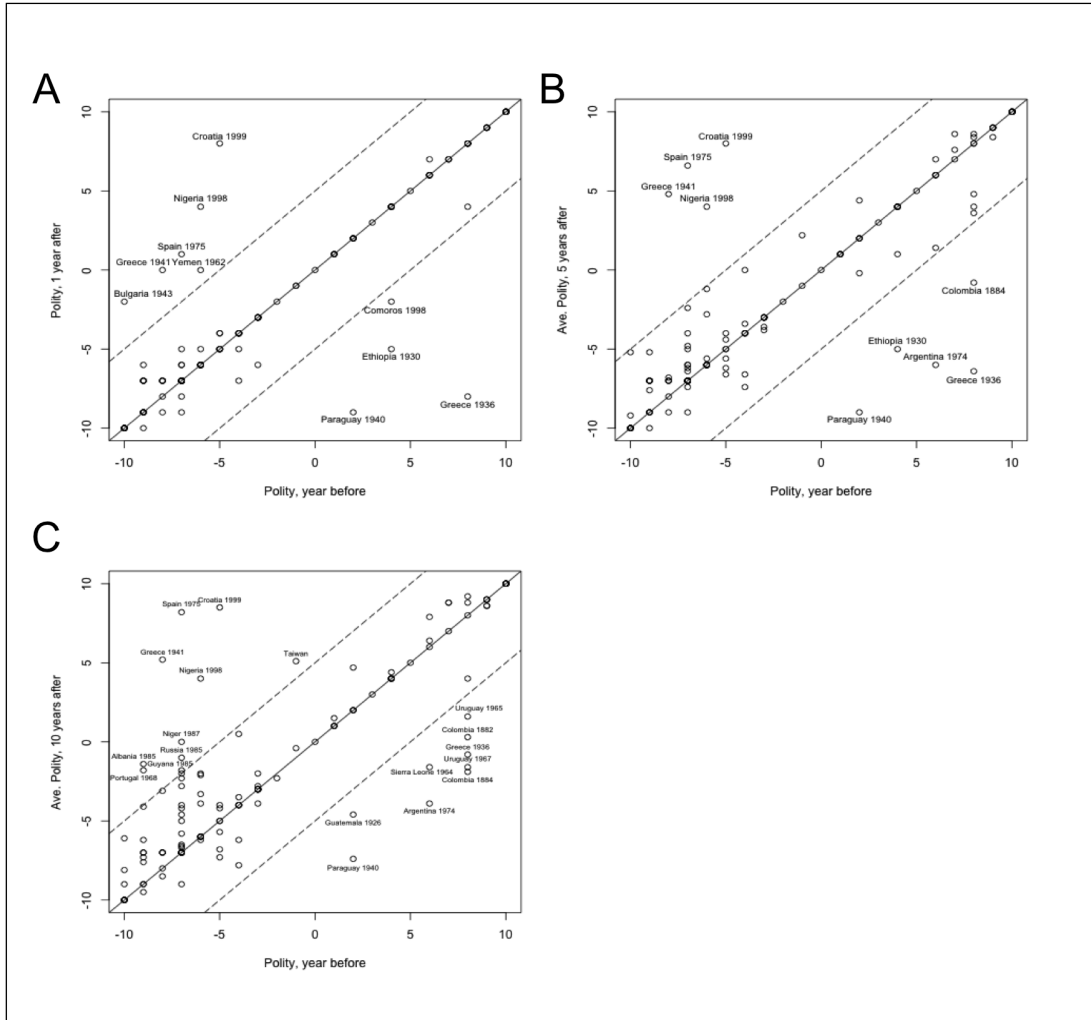
Hummel first shows that leader death does indeed not lead to liberalization in many cases. She uses four different dependent variables to measure liberalization, including Polity, an indicator for Democracy, an indicator for Regime Change, and Absolute Change in Polity. For each of these, she looks at 1-Year post-death, 5-Years post-death, and 10-Years post-death.

Hummel then relies on theories which take into account leader age. On one hand, reformers would be likely to be able to plan for liberalization if the dictator were aged; knowing that an old dictator is likely to die soon, those who are keen on democratization will be more able to make concrete plans which would take advantage of leader transition. On the other hand, regime elites are also able to take advantage of the transition in their own way; because the threat of leader death looms near, they face increased pressure to ensure a smooth transition. Building on existing theories, Hummel hypothesized that liberalization after the death of an old leader is most likely in economically developed regimes (Treisman, 2015), where demand for liberalization would be strong, and in personalist regimes, where there is high uncertainty in succession (Kendall-Taylor & Frantz, 2016).

Using linear and logit regression, with and without fixed effects, Hummel creates forty-eight different models, looking at four key dependent variables: Polity, Democracy, Regime Change, and Absolute Change in Polity. All of these models test the assertion that leader death does not generally lead to liberalization. Next, Hummel uses linear regression models to show that as leaders age, the average marginal effect of leader death on liberalization increases. She further develops these models by separating personalist and non-personalist regimes; she finds that the marginal effect of leader death on liberalization increases in personalist regimes, but not in non-personalist regimes. She lastly separates the regimes by high-development and low-development (in terms of the economy); she finds that high-development does not actually increase the likelihood of post-death liberalization in authoritarian regimes.

### 3 Replication Analysis

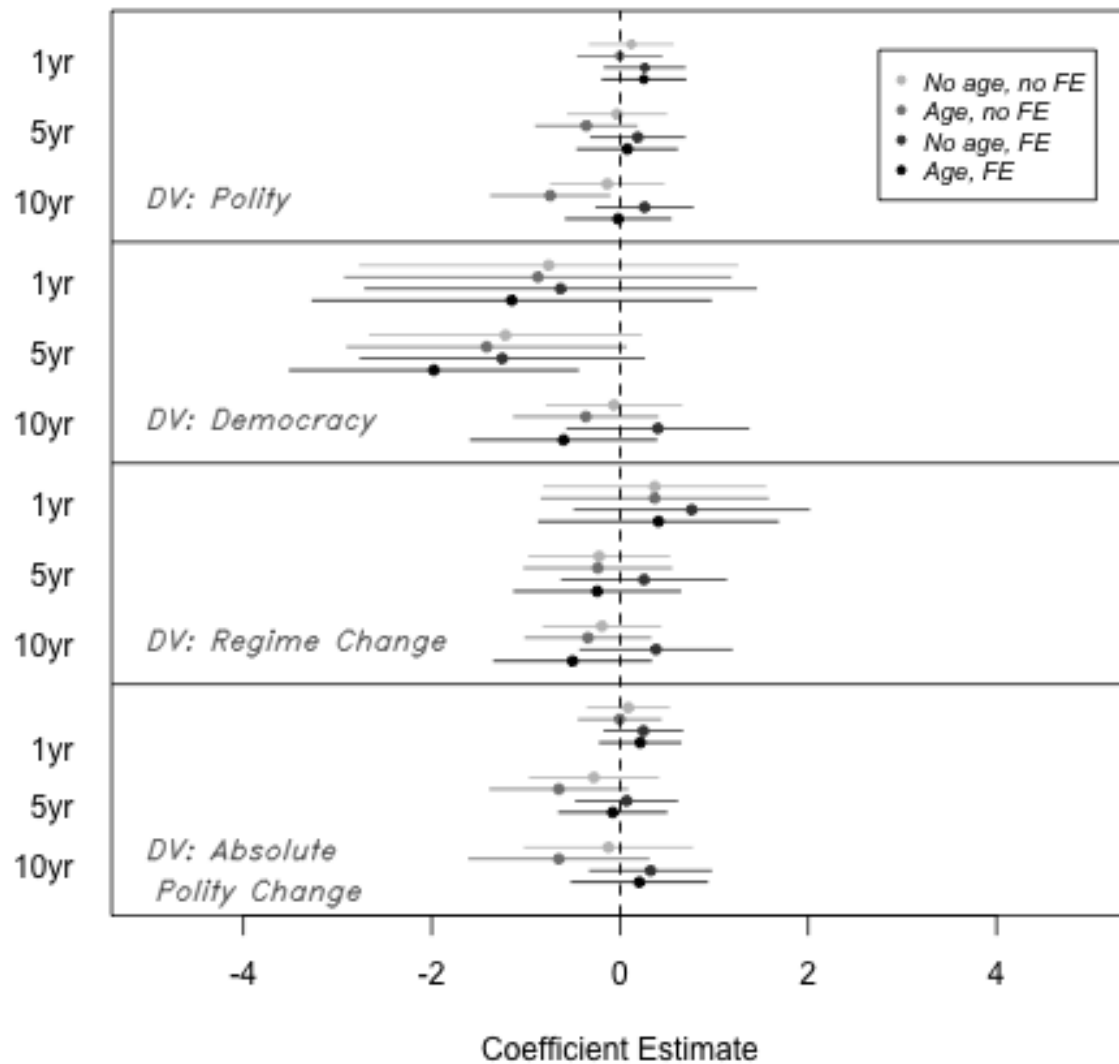
I began with a replication of Figure 1 from Hummel. The figure has three subplots. Each depicts the relationship between the Polity of a country before and after the death of a leader. In each case, the Independent Variable is Polity, the year before the death of a leader. In Plot A, the Dependent Variable is Polity, 1 year after the death; in Plot B, it is Polity, 5 years after the death; and in Plot C, it is Polity, 10 years after the death.



In these plots, one thing becomes abundantly clear, regardless of a leader's death, most regimes' Polity scores do not change drastically, even when we look at five years and ten years after the leader's death. Specifically, note that most regimes fall in the band around the middle of each plot: these are those regimes which did not experience significant differences (more than 5) in Polity scores. If leader death led to political liberalization, we would expect that most regimes would lie in the upper-left corner; these are regimes that experienced significant increases in Polity scores after a leader's death. However, this is not what we see. Instead, we actually see about an even number of regimes in the top left corner and in the bottom right corner; this means that we see just as many regimes which see significant decreases in Polity scores as regimes

which see significant increases in Polity score.

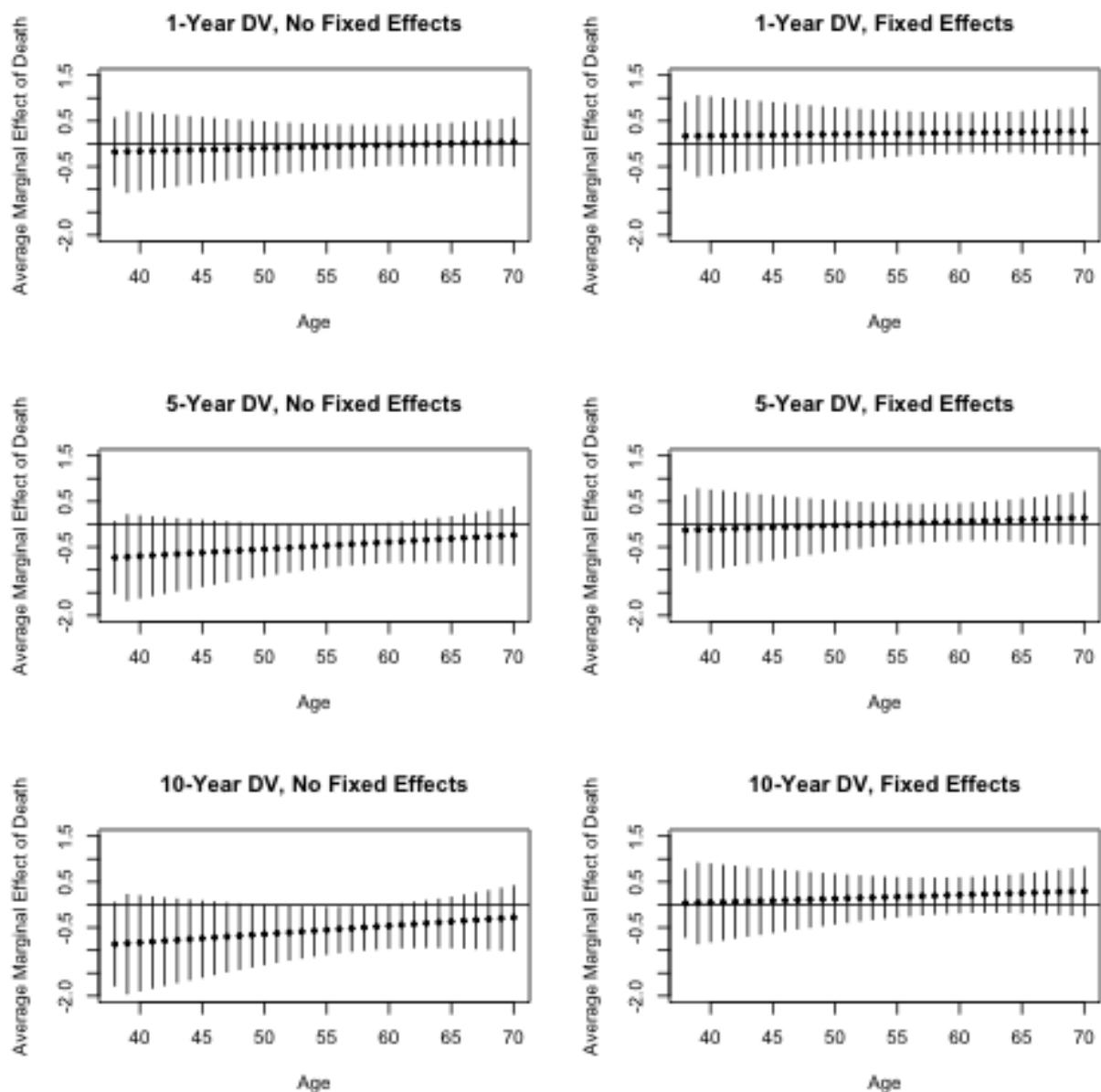
I continued with a replication of Figure 2 from Hummel. The figure depicts the coefficient estimates from a total of 48 different models which assess the effect of leader death on political change. The models are primarily in four different categories, based on their dependent variables. The first set of models uses Polity; the second set of models uses Democracy; the third set of models uses Regime Change; and the last set of models uses Absolute Polity Change. Within each set of models, there are three sub-categories. Each of these uses three different time frames: 1-Year Dependent Variable, which compares the dependent variable in year  $t$  to year  $t-2$ ; 5-Year Dependent Variable, which compares the dependent variable in years  $t$  through  $t+4$  to year  $t-2$ ; and a 10-Year Dependent Variable, which compares the dependent variable in years  $t$  through  $t+9$  to year  $t-2$ . Furthermore, within each of these subgroups, there are 4 versions of the model: one without a control for leader age and without fixed effects; one with a control for leader age and without fixed effects; one without a control for leader age and with fixed effects; and one with a control for age and with fixed effects. All models using Polity and Absolute Polity Change were linear models, whereas all models using Democracy and Regime Change were logit models. For the fixed effects linear models, fixed effects included country and year. For the fixed effects logit models, conditional logit models with country fixed effects were used.



These plots show that, for the most part, the effect of leader's death on political liberalization is insignificant. There is a negative and significant impact on the 5-Year Democracy variable, and in one case with the 10-Year Polity variable. Hummel notes that there is no case in which there is a significantly positive effect on the likelihood of political change. She says, "These results highlight just how unlikely significant political change, particularly in a liberalizing direction, is to follow the death of a dictator" (2020, p. 983).

Next, I replicated Figure 3. In each subplot, the independent variable is age and the dependent variable is the average marginal effect of leader death on Polity. The first row uses the 1-Year Dependent Variable, the second row uses the 5-Year Dependent Variable, and the third row uses the 10-Year Dependent Variable.

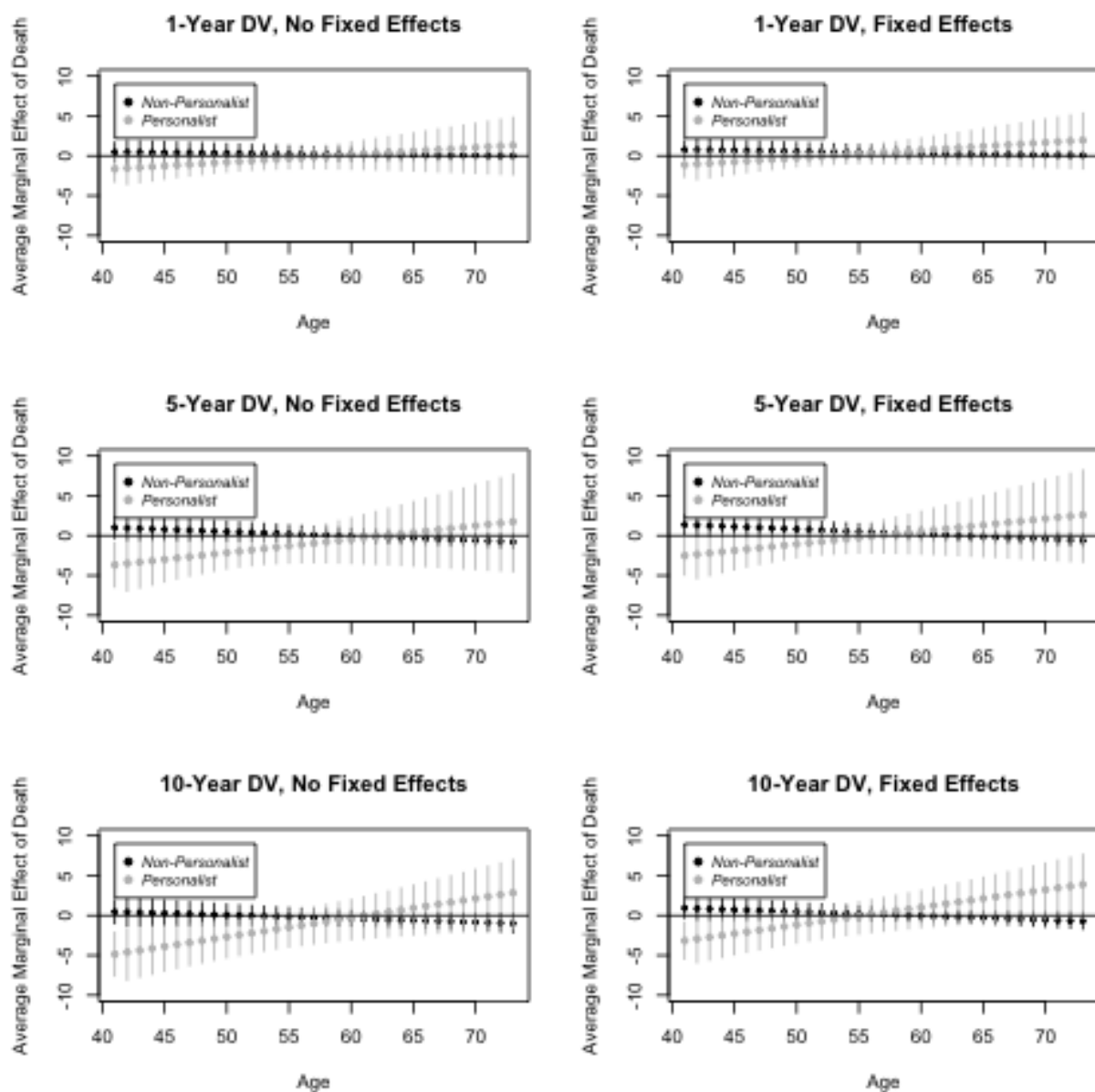
The models used for the first column include no fixed effects, whereas the models in the second column include fixed effect specifications for country and year. All models are OLS linear regressions, and they all include a control for Polity at year  $t-2$ . Marginal effects of leader deaths are calculated using the Margins package in R; the average marginal effect is average of the difference between the predicted value in a year with a death of the leader and the predicted value in a year without a death of the leader.



While all of these model specifications indeed show that the average marginal effect of death on Polity increases as does age, the effect is not large, nor statistically significant (note the overlap of the bars with the line at 0). This provides a good indication that there is support to Hummel’s first hypothesis that “political

liberalization is more likely to follow death as a dictator ages” (2020, p. 986). However, because the results are not statistically significant, and appear to have a relatively small effect, we cannot say that age alone is a major contributor to political liberalization after the death of a leader.

As a result, Figure 4 differentiates between regime type: personalist or non-personalist. The models are nearly identical to those from Figure 3, except for the addition of a triple interaction between death, age, and regime type. Furthermore, these models also include a control for leader age at year  $t-1$ . The fixed effects are the same as described above for Figure 3.

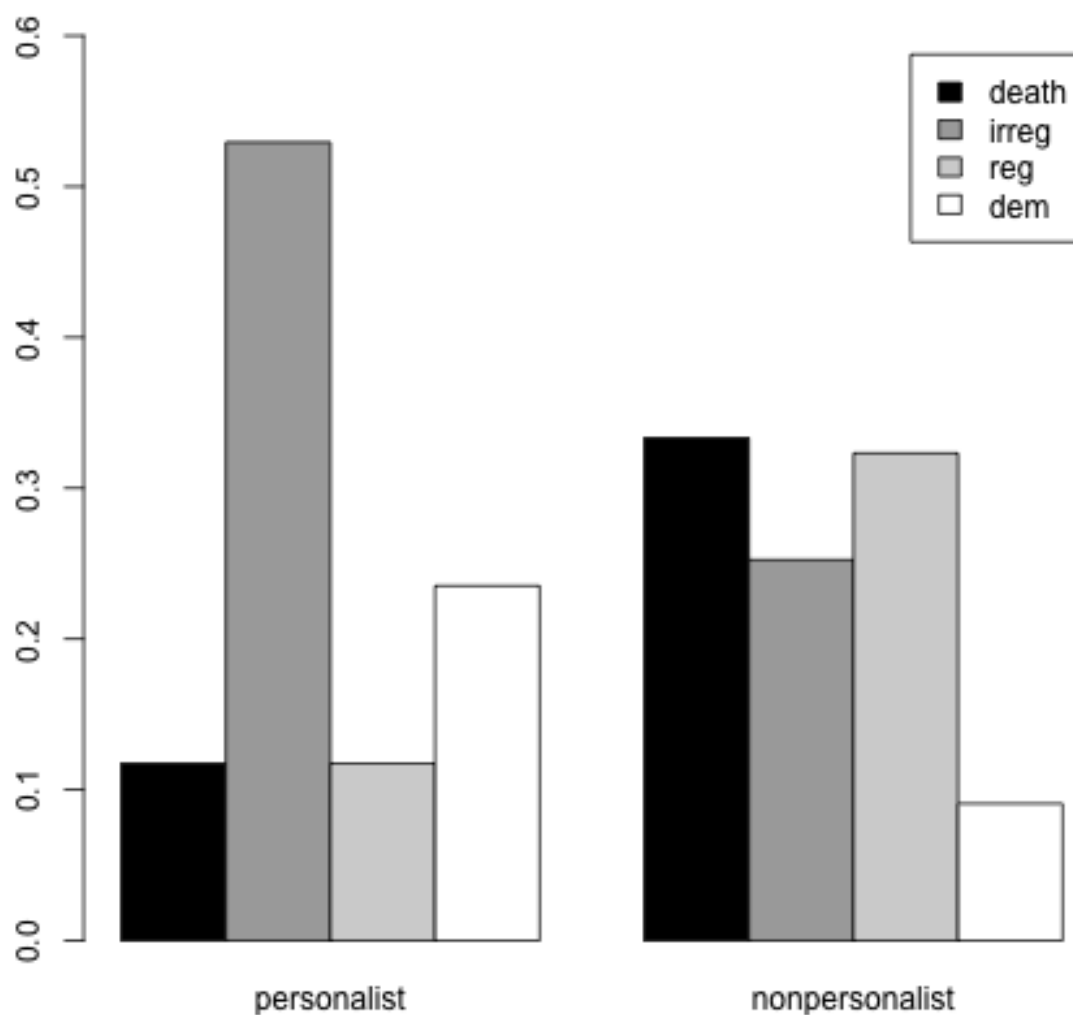


These figures support Hummel’s second hypothesis that “post-death liberalization is more likely as

leaders age in personalist regimes” (2020, p. 986). We can see that in all specifications, as personalist leaders age, the average marginal effect of death increases, whereas the opposite is true in non-personalist regimes. Importantly, the effect is statistically significant in models that use the 5-Year and 10-Year Dependent Variables, which implies that political liberalization likely takes time to occur following the death of a personalist leader; reform is not likely in the year immediately following death.

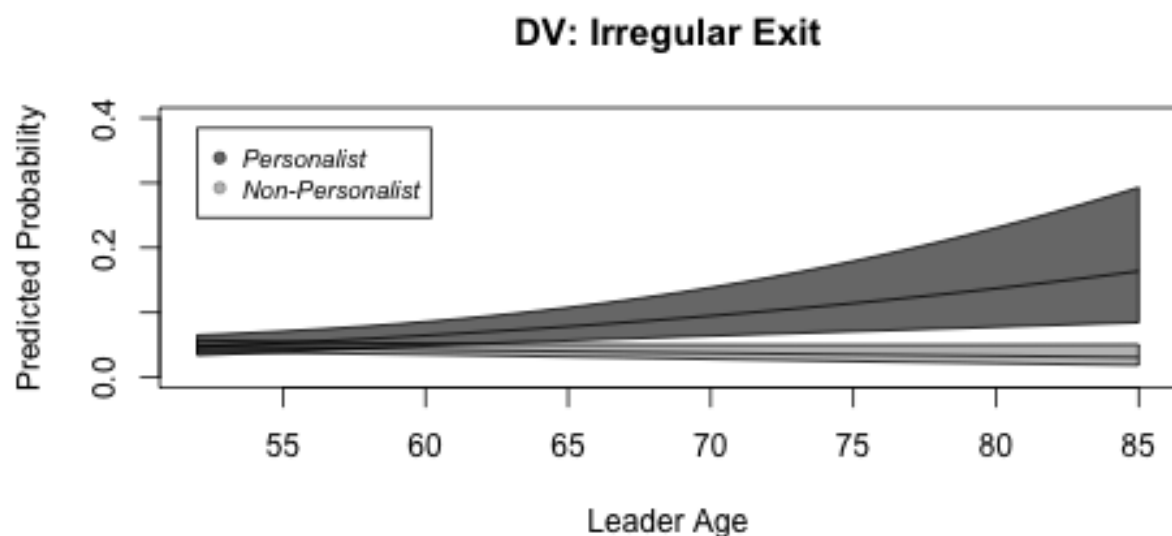
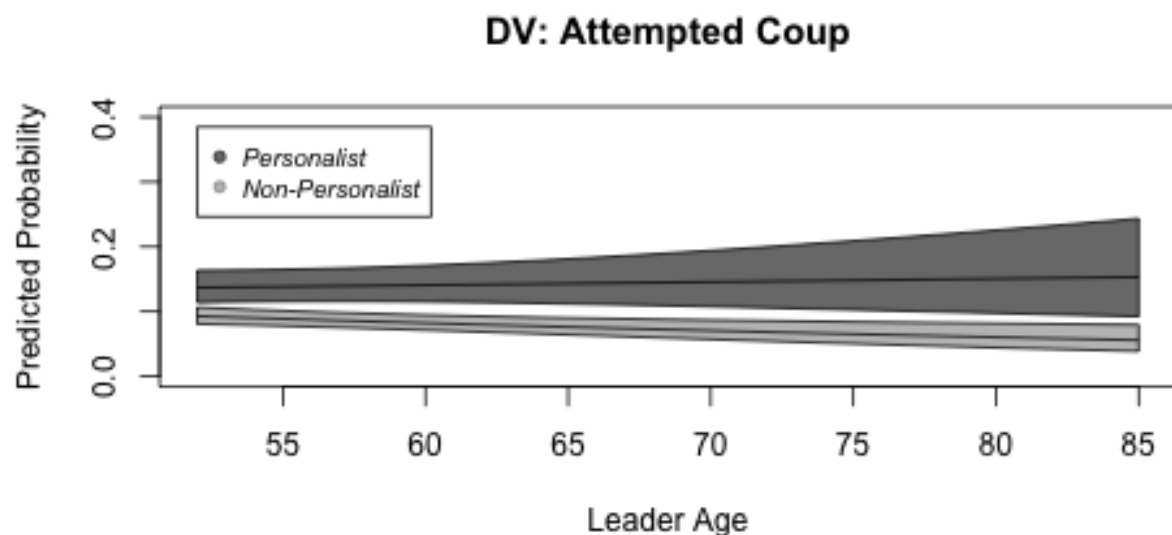
However, Hummel also showed that these events are extremely rare: death only accounts for about 10% of leader exits among personalist dictators. This can be seen in the replication of Figure 5. This shows the proportions of leader exits in personalist and non-personalist regimes which were results of death, irregular exits (such as coups), regular exits (such as term limits or other institutional constrictions), and democratization.





Unfortunately, even though it appears the best chance at political liberalization comes when aging personalist dictators die, we can see that personalist dictators die at much lower rates than non-personalist dictators. However, the increased number of irregular exits warrants further analysis.

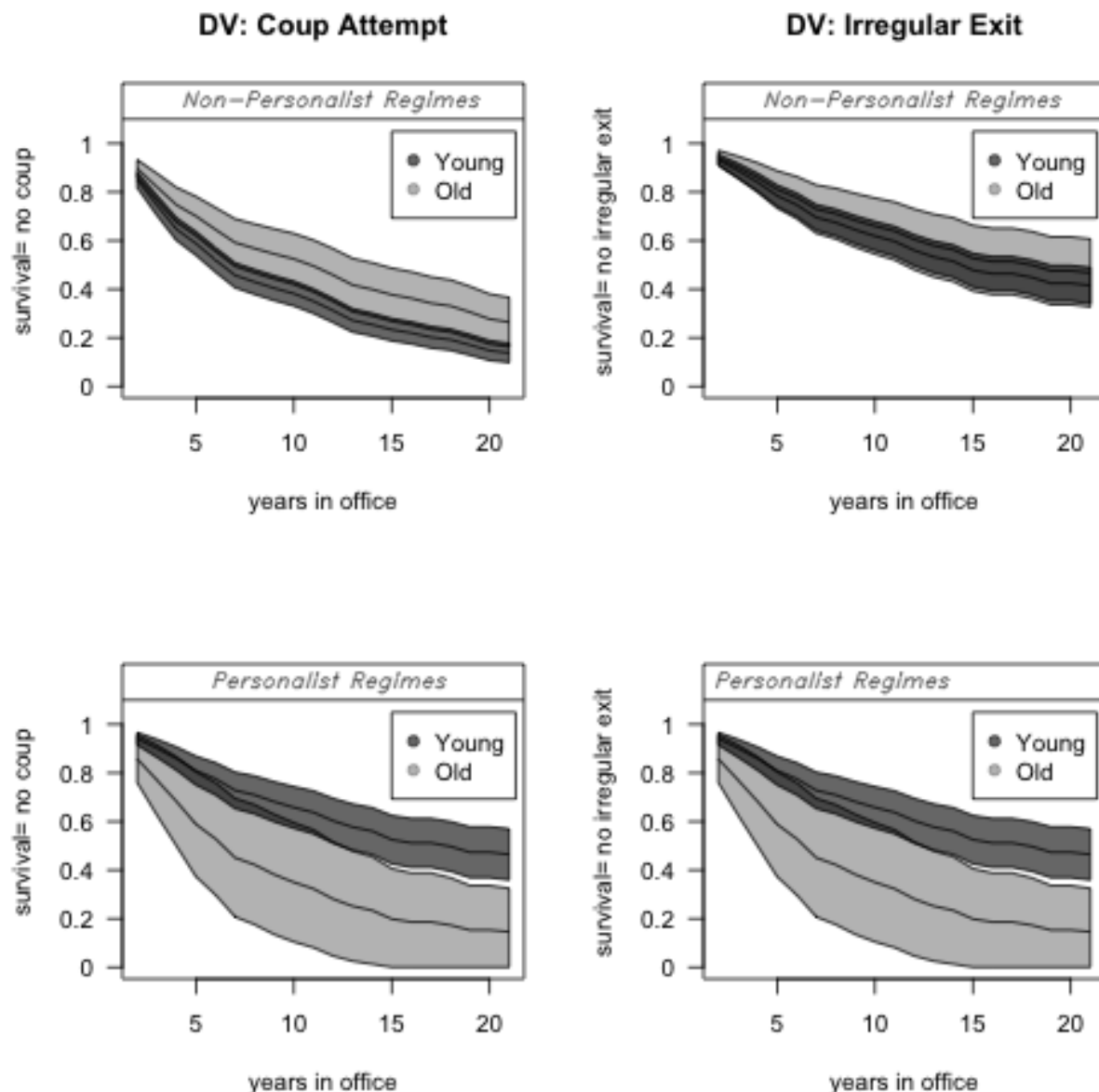
In order to investigate the incidence of irregular exits, Hummel then used logit models to predict the probabilities that a leader would face a coup-attempt or an irregular exit as a function of age and regime type. The models include controls for both the Polity at year  $t-1$  and a lagged count of attempted and successful coups in the last ten years. Here is my replication of Figure 6:



First, my replication was not identical to the initial plot in terms of layout. Mine is slightly more stretched along the x-axis. Substantially, the graphs are the same. We can see that as dictators age, the gap between the personalist and non-personalist dictators' probabilities increases for both attempted coups and irregular exits more broadly. This shows that personalist dictators are particularly susceptible to preemptive coup attempts, indicating that elites are more likely to take preemptive action.

Hummel then plots the survival (as in no coup or irregular exit) probabilities for both personalist and non-personalist regimes, comparing young and old dictators in each. Young and old thresholds are calculated using the 10th and 90th percentiles of dictator ages at death; these end up as 49 and 82, respectively. Using

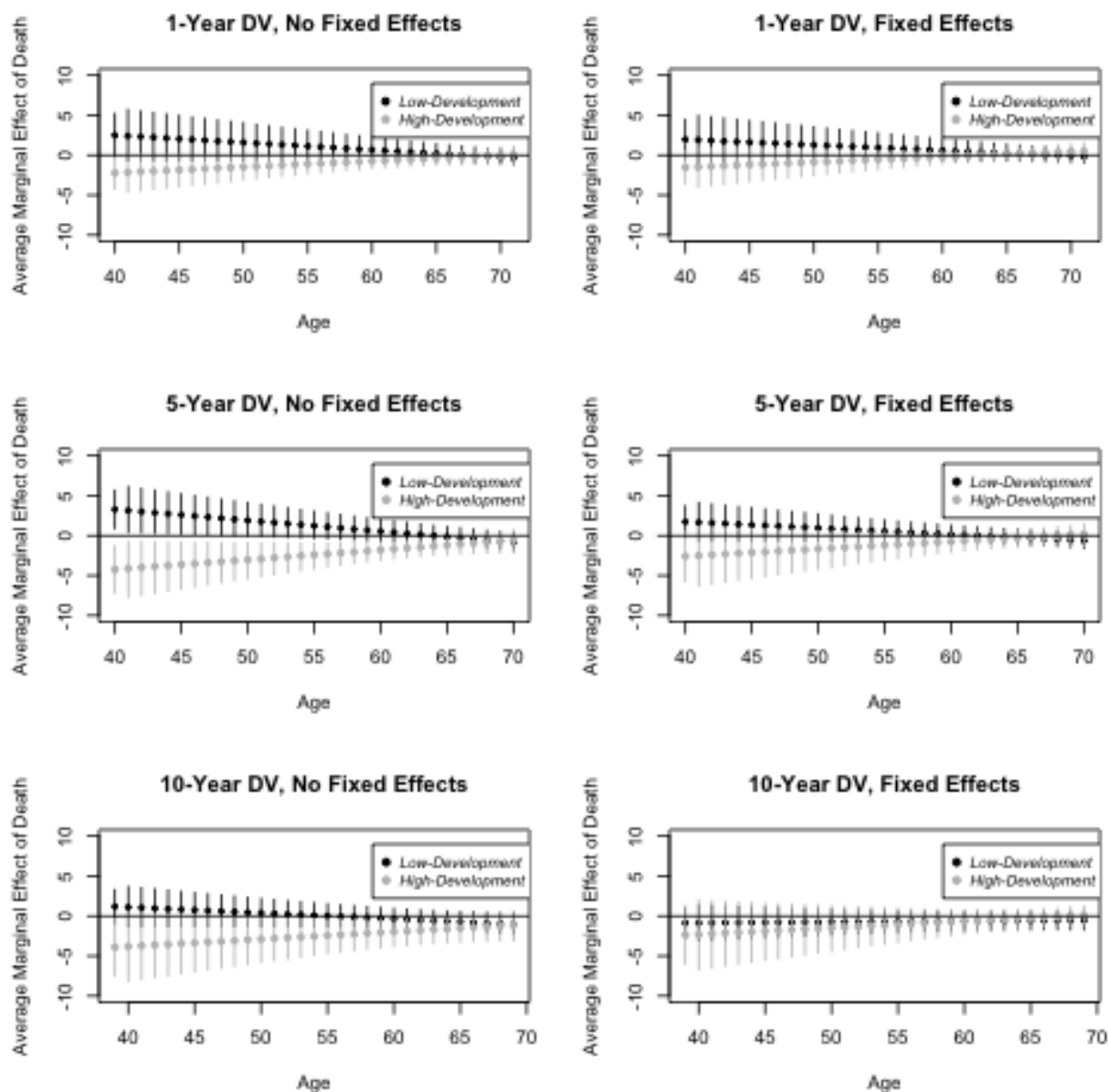
Cox proportional hazard models, she controls for Polity in year  $t-1$  and the number of coup attempts in the last ten years. In full transparency, I am not knowledgeable about Cox proportional hazard models, but I was able to replicate the results thanks to the code provided by Hummel through the Harvard Dataverse.



The overlapping of the young and old intervals in the non-personalist regime plots show that age does not have a significant effect on the probability of survival (i.e. being old does not affect the chances that a non-personalist dictator would face an irregular exit, or more specifically, a coup). However, we can see in the bottom right pane that in a personalist regime, there is a significant distinction between young and old dictators. As the number of years in office increases, so too does the gap in survival probability between

young and old dictators; this means that as old dictators age, they face a significant increase in chances of being ousted from power in an irregular exit.

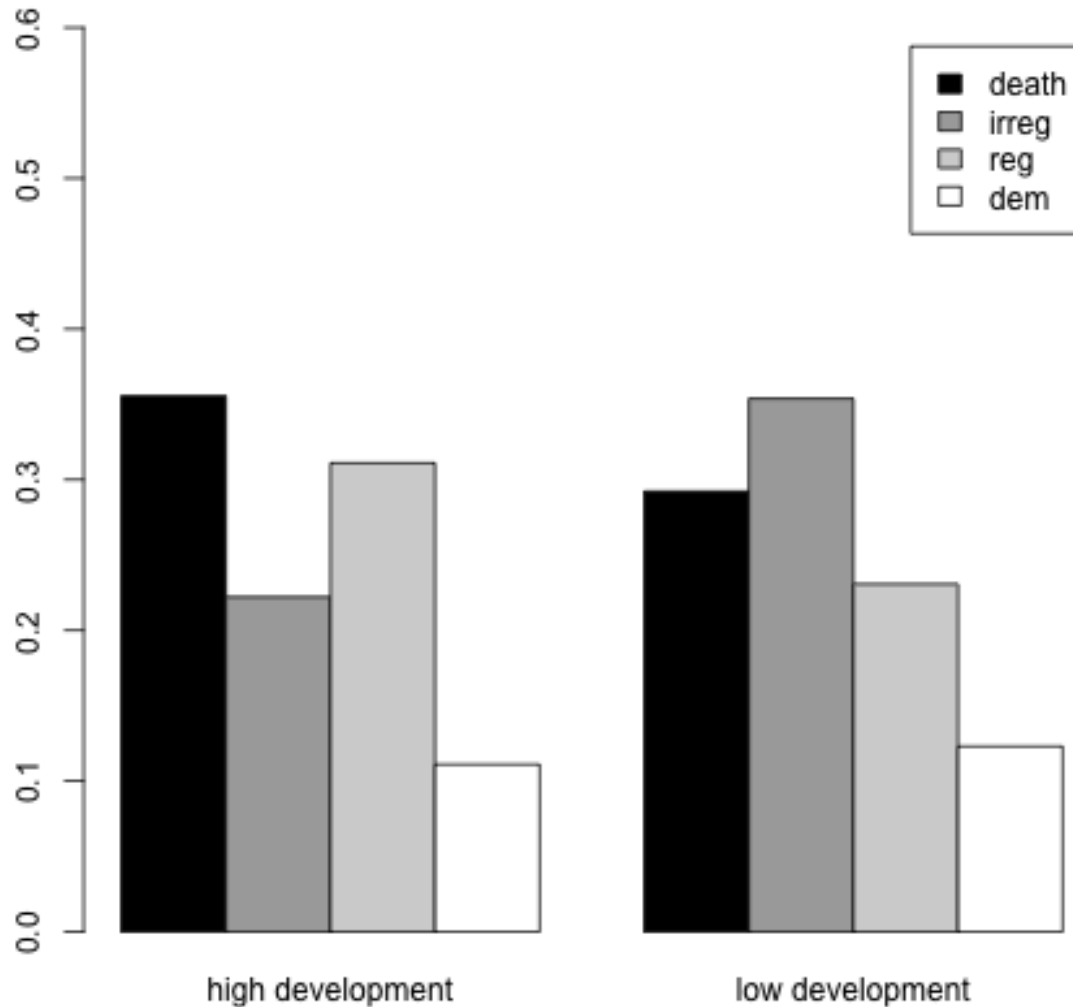
Next, Hummel hypothesizes that “post-death liberalization is more likely as leaders age in economically developed countries” (p. 987). In order to test this hypothesis, she carries out a similar design which was used to create Figure 4; her results are shown in Figure 8. In this case, however, Hummel differentiates by economic development rather than regime type. Here, she focused on Low Development and High Development Regimes. The thresholds are calculated using the 10th and 90th percentiles of the natural log of GDP per capita; these are 6.53 and 8.67, respectively. All models are OLS linear regressions, and include a triple interaction between age, leader death, and development. Controls are included for Polity at year  $t-2$  and there are fixed effects specifications for country and year for those models. The average marginal effects are calculated the same as in Figure 4. Here is my replication of Figure 8:



As Hummel notes, the findings are modest. Based on the directions of the lines, we can see that in an economically developed authoritarian regime, the deaths of older leaders have more positive marginal effects on liberalization compared to younger leaders. On the other hand, in a low-development regime, the deaths of older leaders actually have more negative marginal effects on liberalization compared to younger leaders. It is also important to note that for the most part, confidence intervals overlap, indicating that most of the results are not statistically significant. On the whole, leader death does not increase the likelihood of post-death liberalization in a highly developed country.

Finally, I replicated Figure 9, which shows a bar graph of the proportions of types of removal in regimes

with low development and regimes with high development. Like Figure 5, this shows the proportions of leader exits which were results of death, irregular exits (such as coups), regular exits (such as term limits or other institutional constrictions), and democratization.



We can see that leader death is actually relatively high in proportion to other modes of exit that leaders face in both high development and low development nations. We can also see that in more highly developed regimes, exits through irregular means are less likely than in a less developed regime. This would mean that elites in the nation would be less poised to stage a coup against the leader in a highly developed regime. Thus, in more highly developed regimes, elites would need to use institutional means of replacing the leader

in more cases than in a less developed regime.

## 4 Discussion

## 5 Bibliography

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Kendall-Taylor, Andrea, and Erica Frantz. 2016. “When Dictators Die,” *Journal of Democracy*, 27(4): 159–71