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Perceived job security and politicians' legislative effort

Michael Nower[1]

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Abstract
The relationship between job security and politicians' legislative effort is bidirectional, making isolating the impacts, and the mechanisms underlying them, in either direction difficult. Increased legislative effort could increase politicians' job security, as they might be considered to be more desirable by voters, however, increased job security can change the incentives to engage in legislative activity. We analyse the behaviour of UK Members of Parliament (MPs) from 1997 to 2019 to examine the mechanisms driving any impact of job security on legislative effort, using an instrument for job security that is not impacted by individual effort. We show that the impact of job security on effort is primarily driven by an opportunity cost of time allocation mechanism, with MPs who are less secure in their job allocating less of their time to legislative activities. This opportunity cost increases with the breadth of their legislative effort, and is primarily driven by individuals with lower outside options, who face a greater cost of electoral defeat. We provide reduced-form evidence that this opportunity cost is primarily driven by the maintenance of non-parliamentary human capital by MPs, rather than activities designed to improve their electoral prospects.

Keywords Job security · Legislative effort · Politicians

JEL Classification D72 · J22 · J24

1 Introduction

How and why do politicians change their legislative behaviour when they perceive that they have become more secure in their jobs? Do they '*rest on their laurels*' and reduce the effort they put in, or does the reduced uncertainty encourage them to put in more effort? One difficulty that arises when answering this question is two-way causality: although increased job security may change politicians' legislative effort, increased effort will also change job security, with voters potentially more likely to retain politicians the more 'productive' they are. Therefore, isolating the impact of job security changes on politicians' effort, rather

✉ Michael Nower
michael.nower@durham.ac.uk

[1] Department of Economics, Durham University, Durham University Business School, Mill Hill Lane, Durham DH1 3LB, UK

than the general equilibrium effects of job security changes remains challenging empirically, particularly given the potential for non-linearities in the relationship, which are difficult to capture through one-off changes in job security. This challenge extends to understanding of the mechanisms driving any relationship between the two, which this paper seeks to address.

In order to understand more clearly the mechanisms behind any impact of perceived job security on legislative effort, a setting or instrument is needed in which an individual politician's job security (or its instrument) is observable and time varying, but broadly unrelated to their individual effort, and where their legislative effort is also observable and time-varying. We examine one specific environment that displays all of these characteristics, that of the behaviour of United Kingdom Members of Parliament (MPs), each of whom is the sole representative of a single constituency, elected on a winner-takes-all 'first-past-the-post' system. Within this context, there are clear proxies for the legislative effort put forward by individual politicians, and potential time varying instruments for perceived job security, in the form of their predicted electoral majorities.

With respect to the effort MPs allocate to direct legislative activities, such as voting, scrutinising legislation, or holding the executive to account, the British electoral context means that there is little evidence of any impact of legislative effort on job security, with a general consensus that individual MPs can do little to influence their own electoral prospects through legislative activities, (Butler, 1955; Leonard, 1992; Pattie et al., 1994; Middleton, 2018). For UK MPs the performance of their party nationally and national political trends, such as the UK's vote to leave the European Union or the decline in the electoral prospects of the Liberal Democratic political party after the 2011 rise in student tuition fees are of greater importance (Searing, 1985; Margetts, 2011). The last law requiring an MP to be resident in their seat was abolished in 1774 (Ranney, 1964) and, as Gaines (1998) shows, there is little evidence that individual MPs either are able to, or attempt to, increase their individual support relative to that of the party as a whole. Eggers and Spirling (2017) show that any incumbency advantages are tied to the political party that an individual represents, rather than to any personal vote. This is also supported by survey evidence from the British Electoral Survey, with an average of 1% of people from 2001 to 2019 identifying 'the local candidate' as their reason for voting for a particular party in the last election (Clarke et al., 2003; Whiteley and Sanders, 2014; Fieldhouse et al., 2015, 2018, 2021). Therefore, individual legislative effort is likely to have only a small impact, if any, on an MP's electoral prospects. This stands in stark contrast to the USA, where there is clear evidence of a personal vote, and individual ability to impact electoral prospects (Cover, 1977; Carson et al., 2007; Fowler and Hall, 2014). In the US system, the incumbency advantage is driven by the individual rather than the party, and varies considerably across both politicians and time, suggesting a clear ability for individual politicians to influence their electoral prospects. The difference in the personal versus political vote between the two systems is also reflected in the lower ability of politicians to form political dynasties in the UK (Van Coppenolle, 2017) compared to the USA (Dal Bo et al., 2009).

Additionally, unlike in political systems such as those in the USA, where primary elections play a key role in the electoral process, there is little opportunity for challenges from within an individual MP's party. In the US, individuals may adjust their legislative effort in order to increase their likelihood of success in primary elections, as there is evidence that representatives who are more legislatively successful receive a boost in primary elections (Truel et al., 2022; Ballard and Hassell, 2021), and primary elections play an increasingly key role in the selection of candidates, and hence the job security of incumbents (Hirano and Snyder, 2019). In the UK, formal primary processes do not exist and therefore the

individual job security of an MP is tied only to the security of their parliamentary majority against challenges from outside their own political party, rather than from within it. Therefore, legislative effort is unlikely to play a significant role in determining overall job security for UK MPs.[1]

However, although legislative effort is likely to have little direct impact on the job security of an individual MP, it is likely that their activities related to their constituency, and the balance between these and their legislative activities, could have more of an impact on their job security. Survey evidence from Vivyan and Wagner (2016) shows that voters express a preference for their MP to devote a balanced portion of their time to constituency service. There is clear evidence that MPs respond to these preferences, although the evidence on the actual impact on their electoral security is mixed. There is evidence that MPs who are more electorally vulnerable increase their constituency activities: Norris (1997) surveyed UK MPs, confirming a greater number of hours devoted to constituency service by more marginal MPs, although it is not clear if this came at the expense of, or on top of, legislative effort. Heitshusen et al. (2005) use surveys for MPs across several different countries to confirm that electoral vulnerability is associated with greater stated constituency focus. Auel and Umit (2018) and Umit (2017) focus on MP communications with constituents, showing that MPs from more marginal constituencies communicate more with their constituents in both traditional and digital formats. There is also some evidence of a broader trend towards greater constituency focus later in electoral cycles, with Fazekas and Hansen (2022) showing that absenteeism amongst UK MPs increases with distance from the previous election. Given the finite time available to MPs, any increase in constituency activities is likely to come at the expense of legislative work. Therefore, when examining the impact of job security on legislative effort by MPs it will be necessary to distinguish legislative effort changes resulting from greater constituency focus from those driven by other factors.

Overall, although there is unlikely to be a large link from legislative effort to job security for an individual MP, the impact of non-legislative activities within their overall portfolio of activities is more ambiguous, and there remains the potential for reverse causality from legislative effort to job security for UK MPs, if only through a substitution effect in MP time allocation. Therefore, in order to isolate solely the impact of job security on legislative effort, without the reverse causal mechanism, we instrument an individual MP's job security with the demographic characteristics of their constituency, and changes in political party performances in opinion polls, both of which are unrelated to the behaviour of an individual MP, but are highly influential in determining the votes for particular political parties in individual constituencies, and hence an MP's individual job security. For example, constituencies with a greater proportion of non-white residents are considerably more likely to have larger vote shares for the Labour party (Martin, 2019), constituencies with a greater proportion of student residents are more likely to have larger vote shares for the Liberal Democrat party (Hillman, 2020), and constituencies with a larger proportion of homeowner residents are likely to have a larger vote share for the Conservative party (Furlong, 2019). These demographic characteristics at a constituency level are not impacted by the individual legislative effort of their constituency's MP, but have a significant impact on their electoral prospects, and hence their job security.

[1] Further evidence in favour of this argument can be seen by examining the impact of the average effort of an MP, relative to other MPs in their party, on that MP's re-election prospects. Relative effort has no impact on either the likelihood of the MP being defeated at an election, or ceasing to be their party's MP for their constituency.

We utilise data on UK MPs across six different parliaments (1997–2019) in the UK's House of Commons, including data on perceived electoral vulnerability and different legislative activities including voting, speaking in the Commons, submitting written questions, and signing Early Day Motions (EDMs). We compare competing mechanisms relating to the opportunity costs associated with MP time-allocation, and provide reduced form evidence in favour of some mechanisms over others. The 22-year horizon, and significant changes in electoral vulnerability over the period, allow the isolation of the job-security effort relationship from any competing self-selection or compositional effects.

We show that the impact of job security on legislative effort is positive for UK MPs, with MPs who perceive themselves to be electorally less vulnerable exerting more effort in legislative activities. We control for the characteristics of the individual MP, including the profile of their constituency or constituencies, the number of elections that they have contested, their individual demography, and broader history through the use of MP-Parliament specific fixed effects. We show that, as the opportunity cost of exerting legislative effort increases, with broader proxies for effort, the impact of job security on effort intensifies,as expected. We also provide reduced form evidence on the nature of the mechanisms, showing that it is not driven by political career ladder incentives,[2] that it is mainly driven by less wealthy individuals, and that it weakens the greater the distance from the last election for individuals who have both the lowest outside options, and the ability to maintain their non-parliamentary human capital.

Overall, the contribution of this paper is three-fold. First, we examine the potential for non-linearities in the impact of job security on legislative effort, when this impact is isolated from the reverse causal impact of effort on job security, and also isolated from any self-selection or compositional effects, controlling for an array of MP and constituency specific factors through the use of MP-Parliament specific fixed effects. Second, we provide evidence that the impact of job security on legislative effort is primarily driven by an opportunity cost of time allocation mechanism. Third, we provide reduced form evidence that the opportunity cost mechanism driving the impact of perceived job security on legislative effort is itself primarily driven not by substitution towards constituency activities, but instead by substitution towards the maintenance of non-parliamentary human capital.

2 Existing evidence on the relationship between job security and effort

Extensive literature in both organisational psychology and economics has examined the general relationship between job security and worker effort within non-political contexts. A substantial proportion of this literature has predicted a positive relationship between job security and effort, where increased job security is associated with increased effort (Brockner et al., 1992; Sverke and Hellgren, 2001; Probst et al., 2007; Charness et al., 2017; Brandts et al., 2021). However, a similarly substantial proportion of the existing literature has predicted a negative relationship between job security and effort, where increased job security is associated with decreased effort (Roskies and Louis-Guerin, 1990; Repenning, 2000; Gilboa et al., 2008; Reisel et al., 2010). This negative relationship has also been found within the context of the end of probation (job-trial) periods. At the end of such periods, job security increases dramatically, and ex ante, at this point, productivity falls

[2] See Benedetto and Hix (2007) for a greater discussion of these potential political career ladder incentives.

(Engellandt and Riphahn, 2005; Ichino and Riphahn, 2005; Jacob, 2013). Additionally, within the specific context of academic tenure, further evidence of a negative relationship has been found, with diminished research output post versus pre tenure (Holley, 1977; Carmichael, 1988; Faria and McAdam, 2015; Brogaard et al., 2018).

Other studies have shown a non-linear relationship between job security and effort, such as Staufenbiel and Konig (2010) or Selenko et al. (2013), who find evidence of a U-shaped relationship, where effort is lowest at central levels of job security. These findings have been explained theoretically by Kuvalekar and Lipnowski (2020), who develop a model of job security, effort, and uncertainty to predict and explain a quasi U-shaped relationship between job security and worker effort. However, in all of these papers, with the exception of those examining the impact of academic tenure, there exists dual causality between job security and effort, even if the immediate source of changes in job security are indeed exogenously driven.

Within the political context, there is similarly mixed evidence on the impact of job security on effort, even with limited reverse causality. Dal Bo and Rossi (2011) exploit natural experiments in Argentinian politics and show that politicians randomly assigned to longer terms exert more legislative effort than those assigned to shorter terms who may have lower job security. Fouirnaies and Hall (2021) show that term-limited US state legislators reduce their productivity and increase their absenteeism when they are term-limited at the next election (i.e., as their job security falls to zero). Besley and Larcinese (2011) and Geys and Mause (2016) make use of the retirement announcements of UK MPs, whose expected job security also goes to zero, to show that such announcements are followed by decreased effort in parliamentary activities. In all these studies, there is a positive impact of job security on effort, with job security increases causing effort to increase, and vice versa. However, there is also evidence from the political context of an opposite, negative, impact of job security on legislative effort: Gagliarducci et al. (2011) show that the decreased job security associated with majoritarian vs proportional voting arrangements is associated with lower absenteeism (i.e., greater legislative effort) by Italian parliamentarians and Becker et al. (2009) show that greater job security results in higher outside earnings (i.e., less legislative effort) for members of the German Bundestag. However, with the exception of the paper by Becker et al. (2009), all these political proxies for job security are binary in nature, and therefore, although they can allow the direction to be established, they do not allow for any non-linearities, such as the U-shaped relationship examined in other work, or explore the mechanisms underlying the impact, which we seek to address.

3 The opportunity cost of legislative activities

There are two main components to the job of an MP: Firstly, legislative activity, including contributing to the development of new legislation, and holding the executive to account for their activities. Secondly, given the constituency-focused electoral system in the UK, MPs must also engage in constituency-focused events and communications, such as engaging directly with members of the public in their constituency. UK voters express a preference for their MP to engage in a balanced portfolio of activities across legislative and constituency activities (Vivyan and Wagner, 2016). However, in addition to their responsibilities as members of parliament, MPs are also permitted to engage in other activities, including paid outside employment. The nature of the job of an MP is different from the vast majority of alternative sources of employment, with significant evidence of the development of

parliamentary-specific human capital (Donohue and Holland, 2012), similar in nature to the industry-specific human capital in other industries (Neal, 1995; Gibbons and Waldman, 2004; Sullivan, 2010). Given the differences between the job of an MP and other employment, it is likely that non-parliamentary human capital will depreciate over time, as it does in other settings, such as prolonged unemployment or non-relevant employment (Dinerstein et al., 2022). If MPs believe that they may return to their previous industry after their term in parliament, this will necessitate the maintenance of their industry-specific human capital, through the investment of time.[3] Therefore, as with all employment, MPs face an opportunity cost of allocating their time between different activities: specifically, between engaging in direct legislative activities, such as voting or speaking in parliament, engaging in constituency-related activities, and engaging in activities unrelated to their role as an MP, including maintaining non-parliamentary human capital. We examine the trade-offs associated with the opportunity costs of time allocation, and how these relate to the electoral security of the individual MP.

In the absence of the need to engage in constituency-focused activities for electoral purposes or to engage in the maintenance of non-parliamentary human capital, it is likely that MPs will maximise their legislative activity. In the absence of such time constraints, the existing evidence suggests that MPs would engage in more legislative activities as a result of one or more of the following: political constraints, maximising representation of their communities and/or enacting and influencing policy. Political constraints, deriving from political party pressure (through the whipping of MPs in the UK context) increase legislative participation (Carey, 2007). There is also evidence that individuals who enter politics, including MPs, are at least partially motivated by the desire to represent the interests of the local communities and groups that they have been elected on behalf of Balian and Gasparyan (2017); Sobolewska et al. (2018). Finally, politicians could be motivated by a desire to enact or influence public policy (Müller, 2007). In all these cases, absent other incentives, politicians would maximise their legislative activities. However, given that trade-offs on time allocation do exist, for electoral purposes in the case of constituency activities, and for future employability in the case of human capital, the extent of an MP's legislative activities will be determined by the extent of the opportunity cost that they face with allocating time to legislative activities, and away from constituency focussed activities or the maintenance of non-parliamentary human capital.

If MPs do face such an opportunity cost associated with the allocation of their time across different activities, then this opportunity cost will vary with their electoral vulnerability. MPs who face a higher probability of defeat in subsequent elections need to allocate more effort towards (1) maintaining their electoral position, and (2) preparing for the possibility of defeat. In the UK context, to maintain their electoral position, vulnerable MPs are likely to devote more time towards constituency service, given the potential impact of this on their future votes. In order to prepare for the possibility of defeat, vulnerable MPs are also likely to devote time towards the maintenance of non-parliamentary human capital. Therefore, MPs who perceive themselves to be electorally more vulnerable face a greater opportunity cost of legislative effort, with the size of this opportunity cost increasing with their perceived electoral vulnerability. If this opportunity cost mechanism operates in a similar manner to the non-linear relationship between job security and effort in broader employment (Staufenbiel and Konig, 2010; Selenko et al., 2013; Kuvalekar and Lipnowski,

[3] Any long-term depreciation of non-parliamentary human capital across different legislative terms will be captured through MP-Parliament fixed effects, therefore we are focussing on only depreciation within, rather than across, parliamentary terms.

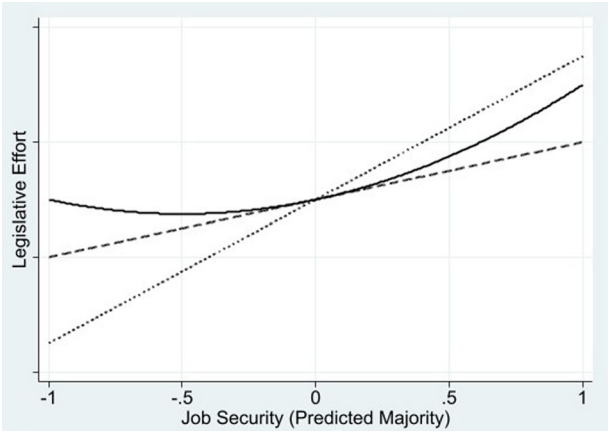

Fig. 1 Stylised mechanism representation

2020), then this impact could also be non-linear in nature. This is likely to be the case if the primary motivation is related to constituency service, and hence electoral security. Individuals who are secure in their seats will tend to put more effort towards legislative activities, as they need to devote less time to securing their position through constituency service. As their job security decreases, they will put in more time in constituency activities, and hence less in legislative activities. However, for individuals who have nearly no job security, and are practically certain to lose their seats, the benefit of constituency service is near zero, as their likelihood of winning is also near zero irrespective of their level of constituency service. Thus, at the very lowest levels of job security, legislative effort is likely to be higher, as individuals seek to influence policy and represent their constituency while they are still in office. It is the individuals who have middle levels of job security that will focus most on constituency activities, as it is likely to have the greatest impact on their job security, and it is therefore these individuals who are likely to put in the least legislative effort. This would then translate into a U-Shaped relationship between job security and legislative effort.

Additionally, the opportunity cost of exerting legislative effort will increase as the size of this effort increases, which will also be more significant the greater an MP's electoral vulnerability. The two opportunity cost mechanisms above are also directly tied to an individual's outside options, with MPs with greater outside options facing less of a cost upon defeat, which is likely to lead to less effort in maintaining their seat, and less investment in non-parliamentary human capital maintenance. Combining all these relationships associated with the two opportunity costs mechanisms, we arrive at and test the following related hypotheses, which we illustrate in stylised fashion in Fig. 1:

(H_1) As the perceived electoral security of an MP increases, so will their legislative effort.

(H_{1a}) As the perceived electoral security of an MP increases, so will their legislative effort, but in a non-linear fashion, in the manner of Staufenbiel and Konig (2010), Selenko et al. (2013), and Kuvalekar and Lipnowski (2020).

(H_2) As the opportunity cost of exerting legislative effort increases, job security will have more of an impact on legislative effort levels.

(H_3) The opportunity cost of exerting legislative effort is higher for individuals with lower outside options.

An individual's baseline propensity towards legislative effort and any roles that they hold will affect the vertical position of the lines on the graph. Individuals who have a higher baseline propensity towards legislative effort will have lines that lie higher on the graph, and vice versa for individuals with lower propensity towards effort. As outlined above, if the primary driver of the opportunity cost is constituency services, and hence electoral security, then we would expect a U-Shaped relationship between job security and effort (the solid line). Individuals with a high probability of defeat devote more time to legislative effort while they are still in office, as do individuals who have a high probability of retaining their seat, who do not need to devote much time to their constituency. The point of inflection will lie to the left of '0 predicted majority', as MPs on the margin of defeat, near zero majority, will still increase their constituency activities as job security increases. It is only those individuals with almost certain defeat that will have the opposite relationship. However, if the primary motive is the maintenance of human capital, then a linear relationship would be expected (the dashed line), as more secure individuals need to devote less time to preparing for electoral defeat. This linear relationship is, however, dependent on the ability to maintain non-parliamentary human capital, as well as the extent of outside options. If an individual is not in the type of employment where human capital can be maintained outside of that specific employment, or if they have sufficient outside options and do not need to maintain their non-parliamentary human capital, then this linear relationship would not apply, and a non-linear relationship is more likely. Meanwhile, greater time needed for a given level of effort will increase the trade-off between the legislative effort and other activities, and hence the strengthen the relationship between job security and legislative effort, reflected in a steeper slope on the relationship (the dotted line).

There is clear evidence of a short-term, myopic, memory amongst voters (Bechtel and Hainmueller, 2011; Cole et al., 2012; Healy and Lenz, 2014; Ruiz et al., 2023). As a result, the incentives to engage in activities designed to increase electoral security will be stronger closer to an upcoming election, as it is at this point that they have the maximum impact. Thus, MPs will focus more on constituency-related activities closer to an upcoming election. This focus on constituency activities is likely to come at the expense of legislative focus, which is consistent with the behaviour of UK MPs examined by Fazekas and Hansen (2022). As the distance from the previous election increases and the distance to the next election decreases, MPs are more likely to be absent from parliamentary votes. This effect should be intensified amongst the most electorally vulnerable MPs, who have the greatest probability of defeat, and the greatest incentives to maximise their votes on the margin. There is evidence of this effect in the US where politicians adjust both the extent of their legislative activities (DeWitt, 2021), as well as the nature of their activities and contributions (Thomas, 1985, 1991; Ahuja, 1994), with this effect being more prevalent for more electorally vulnerable politicians (Rowlands and Vander Wielen, 2021). However, at the same time as the incentives to engage in constituency related activities to maximise their electoral security, they also have incentives to engage in activities unrelated to their role as an MP in order to maintain their level of non-parliamentary human capital, which would otherwise be expected to depreciate over time. The total amount of human capital depreciation will be directly related to the period of time over which it depreciates. Close to an upcoming election, there is little opportunity for human capital to depreciate, and little incentive to invest time in its maintenance, and vice versa for periods close to a past

election, where total depreciation before the next election will be highest. This relationship will again be intensified for individuals who are electorally less secure and are therefore more likely to require their non-parliamentary human capital in future employment.

The relationship between the impact of job security on effort and the distance from an election will therefore be an indicator of which opportunity cost mechanism is dominant. If it is the opportunity cost of constituency service and electoral security that is dominant, then we would expect the impact of job security on effort to increase further into a parliament and closer to an election. However, if it is the opportunity cost of non-parliamentary human capital maintenance that is dominant, then we would expect the opposite, with the impact of job security on effort decreasing the further into a parliament and the closer to the next election. We therefore test the following two contradictory hypotheses:

(H_{4a}) The impact of job security on effort becomes larger as the time since the previous election increases, with the opportunity cost of legislative effort relative to constituency effort increasing.

(H_{4b}) The impact of job security on effort becomes smaller as the time since the previous election increases, with the opportunity cost of legislative effort relative to human capital maintenance decreasing.

4 Empirical specification

To test our hypotheses we examine MP legislative behaviour from the 1997 General Election until the 2019 General Election. This encompasses 6 different parliamentary terms, following 6 general elections(1997–2001, 2001–2005, 2005–2010, 2010–2015, 2015–2017, & 2017–2019),[4] covering 228 months when parliament was in session. To examine the impact of changes in perceived job security on legislative effort we estimate the following empirical specification:

$$E_{mp,t} = \alpha_0 + \alpha_1 \hat{JS}_{mp,t} + \phi X_{mp,t} + \theta_{mp,E} + \varepsilon_{mp,t}, \tag{1}$$

where for an individual MP, in period t, $E_{mp,t}$ is the legislative effort that they put forward and $\hat{JS}_{mp,t}$ is their perceived Job Security. $X_{mp,t}$, is a vector of MP-period specific controls accounting for direct relationships between certain roles in parliament and the proxies for effort that we are using, e.g. 'Junior Ministers' are obliged to attend and vote for their party's position in votes that are deemed important to the government's agenda, and must resign from their ministerial role if they do not. $X_{mp,t}$ includes controls for a wide array of different government and opposition posts.[5] $\theta_{mp,E}$ are MP-Parliament fixed effects, which control for any factors that impact on an individual's average legislative effort over a given

[4] General elections in the UK can coincide with elections at a local level. However, the local election cycle differs from the general election cycles. The local elections are usually every four years, whereas the maximum cycle for general elections is five years, but can take place more quickly, as was the case for the 2017 and 2019 elections.

[5] The posts we control for are Prime Minister, Leader of the Opposition, 'Great Offices of State' (Chancellor, Home Secretary, Defence Secretary, Foreign Secretary), Shadow 'Great Offices of State', Cabinet, Shadow Cabinet, Minister, Shadow Minister, Junior Minister, Shadow Junior Minister, Minority Party Leader, Minority Party Spokesman, Select Committee Chair, Select Committee Member, and Other 'Party' roles (Party Chairman etc.).

parliament, including time-invariant factors such as their socioeconomic, demographic, and political characteristics, the characteristics of their constituency, including its geographic location, and also any factors that vary between parliaments but are invariant within parliaments, such as the constituency results in the previous election, whether the MP is in the governing party, the total number of parliamentary terms that an individual has served etc. We therefore abstract away from any variations in an individual's average effort across individuals and across parliaments and are examining the impact of job security on effort on a within-MP, within-Parliament basis.[6] $\varepsilon_{mp,t}$ is the error term. We allow for clustering of residuals at the individual MP level. To address the possibility of a quadratic relationship between job security and effort, such as that examined by Selenko et al. (2013) and Kuvalekar and Lipnowski (2020), we also estimate the following extended specification:

$$E_{mp,t} = \beta_0 + \beta_1 \hat{JS}_{mp,t} + \beta_2 \hat{JS}^2_{mp,t} + \phi X_{mp,t} + \theta_{mp} + \varepsilon_{mp,t}. \quad (2)$$

Legislative effort ($E_{mp,t}$):

In order to estimate the coefficients in specifications (1) and (2), we first need proxies for legislative effort (E). In our initial specification we proxy effort with the (log) proportion of parliamentary votes in which an individual MP votes in a given period, similar in nature to the 'absenteeism' outcome measured in Gagliarducci et al. (2011) and Fazekas and Hansen (2022). We focus on the proportion of votes in which an individual MP votes, rather than the raw number of votes, to account for the differing number of votes in different months and different parliaments, in particular, changes in the total number of votes over the electoral cycle. As part of the testing of hypothesis H_2, we explore broader proxies for effort, including an MP's signing of Early Day Motions (EDMs), and their spoken and written contributions in the House of Commons. Unlike in systems such as the USA, members of the executive branch of government in the UK are drawn from members of the legislature, and therefore membership and/or participation in parliamentary committee activities is not an appropriate measure of effort, as it excludes numerous MPs with governmental and opposition roles who are prohibited from serving on such committees.

Perceived job security ($\hat{JS}_{mp,t}$):

In order to isolate solely the impact of job security on effort from any potential reverse causal mechanism, we cannot use a direct measure of an MP's job security, such as their realised parliamentary majority. One possible approach to partially avoid this endogeneity problem would be to interact the votes in the previous election for each individual party, with the change in that party's standing in opinion polls. In this case, the time variation in job security would be invariant to effort, given that, as previously discussed, the performance of an individual MP is primarily driven by the performance of their party and national political trends. The legislative effort put forward by an individual MP is unlikely to have any significant impact on their party's performance in opinion polls, and therefore any movement in these polls is exogenous to the individual MP. It could be argued that although an individual MP's legislative effort will not impact the opinion polls, aggregate effort by all a party's MPs will have more of an effect. Examining the relationship on a within-parliament basis (thus controlling for average opinion poll levels) between the

[6] The majority of our results are also robust to including time period fixed effects. The key exception is the coefficients on the election distance interactions in Sects. 5.4 and 5.5, which become insignificant. This is expected, given the high degree of collinearity between time-period fixed effects and distance from the previous election variables.

average effort put forward by MPs from a party in a given month and that party's performance in the opinion polls in the following month shows no significant relationship between the two for MPs from the Labour Party, Conservative Party or Liberal Democrat party. Outside factors, such as the economic situation, external shocks, such as the UK's exit from the European Union and specific policy actions, such as the rise in tuition fees and associated fall in the political fortunes of the Liberal Democrat party (Dommett, 2013; Butler, 2020), play a much more substantial role in determining party performance than legislative effort by their MPs.

Within the UK context, where more than two parties are competitive in different constituencies, it is important that the interaction is between opinion poll changes for all parties and votes for each individual party, rather than solely between the changes in the opinion polls for the party of a given MP (and their nearest opponent) and their majority. The security of an individual MP is determined not solely by the performance of their party compared to one single other party, which, in the case of a two-party system would be the same opponent across all constituencies, but by the performance of their party compared to the party of their closest competition, which varies across constituencies, given the multi-party nature of UK elections. As an example, assume that both the Conservative party and Labour party experience an equally sized fall in the opinion polls at the same time as the Liberal Democrat party experiences a rise in the opinion polls. A Conservative MP whose constituency is marginal between the Conservatives and Labour will experience no change in their job security, while a Conservative MP whose constituency is marginal between the Conservatives and the Liberal Democrats will experience a substantial fall in their job security. If the change in the opinion polls was solely interacted with the performance of an MP's party, then this additional source of variation would be lost. In two-party systems like that in the USA, a direct interaction of party opinion poll changes and majority would be sufficient, as any substantial fall in polling for one of the two parties is matched by a rise in polling for the main opposing party, which is not necessarily the case in multi-party systems such as the UK. Of the 610 constituencies in our sample, 45% are predicted to have all three of the main parties as 'runner-up' in at least one period, and 15% are predicted to have all three of the main parties as the 'winner' in at least one period.

Implicitly, in this approach, and any approach that interacts votes with relative opinion poll changes, we are assuming that the change in the number of votes for a party in absolute terms is related to the total number of votes cast for that party. I.e. for a given percentage change in opinion polls for a given party, the number of votes moves in relative rather than absolute proportion. For example, assume that at a previous election, party X received 40% of the vote nationally, then, at a future date t, they are projected to receive 30% of the vote nationally. In a constituency where they received 80% of the vote in the previous election, their predicted votes in that constituency would be 60% (relative poll change), rather than 70% (absolute poll change). Examining the relationship between the average votes received by a party in a given consistency in the previous election and the change in their votes in absolute terms at the following election shows a clear positive and significant relationship between the two for the Conservatives, Labour, the Liberal Democrats, and 'Other' votes. This indicates that votes do move in a proportional manner rather than in an absolute manner, and the largest changes in vote percentage for a party are found in constituencies with the greatest concentration of votes for that party.[7]

[7] Our results are robust to using absolute changes in opinion polls, rather than relative changes.

However, the key disadvantage of this approach, interacting opinion poll changes with votes in the previous election in a given constituency, is that there remains a possible source of endogeneity, derived from the votes in a constituency in the previous election. Although the change in job security coming from relative party performance in opinion polls may be exogenous at an aggregate level, this is interacted with the endogenous performance of an MP in the previous election. An individual MP's propensity towards legislative effort would influence their effort in previous parliaments and, therefore, may be reflected in the votes that they received in the previous election. Given that we interact the opinion polls changes with these votes, this introduces a further source of potential endogeneity. Therefore simply interacting the opinion polls with votes in the previous election, whilst avoiding one source of endogeneity, is still susceptible to the other. To avoid this problem, instead of interacting the opinion poll changes with realised votes in the previous election, we instead interact with instrumented votes, derived from the demographic profile of individual constituencies.[8] Neither the demographic profile of an individual constituency nor, as previously discussed, the aggregate movement of opinion polls are impacted by the individual legislative effort of a given MP, removing the potential for reverse causality in our analysis. Instrumented perceived job security for each MP in period t is calculated as follows:

$$\hat{JS}_{mp,t} = \frac{\hat{V}_{c,w} \times \Delta OP_{t,w} - \max(\hat{V}_{c,x} \times \Delta OP_{t,x}, \hat{V}_{c,y} \times \Delta OP_{t,y}, \hat{V}_{c,z} \times \Delta OP_{t,z})}{\hat{V}_{c,w} + \hat{V}_{c,x} + \hat{V}_{c,y} + \hat{V}_{c,z}}, \tag{3}$$

where w denotes the party of the individual MP, x, y, and z represent the other competitor political parties, $\hat{V}_{c,w}$ is the fitted number of votes in the previous election for party w in the MP's constituency c and $\Delta OP_{t,w}$ is the change in the current opinion poll in period t for party w, relative to the percentage of votes for that party in the last general election. In order to obtain the fitted values for votes for each individual party in a particular constituency, we estimate the following specification for each party at each general election, using demographic data across all constituencies in England, irrespective of the winning party in that constituency:

$$\begin{aligned} V_{c,p} = \gamma_{0,p} + \ & \gamma_{1,p} O16_c + \gamma_{2,p} Pen_c + \gamma_{3,p} NW_c + \gamma_{4,p} Ill_c + \gamma_{5,p} NQ_c \\ & + \gamma_{6,p} Stu_c + \gamma_{7,p} Own_c + \gamma_{8,p} Car_c + \gamma_{9,p} LP_c + \varepsilon_{c,p}. \end{aligned} \tag{4}$$

where, for each party $p \in w, x, y, z$, in each constituency c, $O16$ is the proportion of the population aged over 16, *Pen* is the proportion of the population of pensionable age, *NW* is the proportion of the population who are from an Ethnic group other than White, *Ill* is the proportion of the population suffering from a long-term illness, *NQ* is the proportion of the working age population with no qualifications, *Stu* is the proportion of the working age population who are economically active students, *Own* is the proportion of households that own their property, *Car* is the proportion of households that own a car or van and *LP* is the proportion of households made up of lone parents. The choice of demographic variables in the specification is driven by the need for consistent data across different parliaments, which limits the available characteristics. The coefficients β are estimated separately

[8] Our key results are robust to instead interacting the movements in the opinion polls with the realised votes at the previous election, rather than the 'fitted' votes. There are changes in the magnitude of the coefficients, with smaller coefficients when using 'fitted' votes, suggesting some endogeneity in the link from previous election results to current effort.

for each political party w and for each general election. Once the specification has been estimated, we then obtain fitted values for the votes for each party in each constituency at each election, which we then use to calculate our proxy for job security as set out in Eq. (3). These calculated proxies for job security are then utilised directly in the estimation of specifications (1) and (2).[9] In each constituency, the demographic characteristics above are invariant to the behaviour of their individual MP, but play a key role in determining the votes for each political party in that constituency. Therefore, when combined with movement in the opinion polls (which are also invariant to the behaviour of individual MPs) in the way Eq. (3) sets out, the fitted predicted majority represents an appropriate instrument for job security, allowing the isolation of the impact of job security on effort from the reverse causal mechanism.

Data summary:

The data series on opinion polls are only available at a UK level, rather than disaggregated by constituent nation, therefore, in this analysis, we exclude MPs representing constituencies in Northern Ireland, Scotland and Wales, where nationalist parties represent a significant electoral presence. We also exclude from our analysis MPs who do not participate in parliamentary activities, including MPs who were on medical leave, and the Speaker and Deputy Speakers of the House of Commons, who are prohibited from voting and participating in debates. Excluding these MPs leaves 1091 distinct MPs over our period of analysis. We define a period, t, as one month giving a total of 117,803 MP-time observations.

The sources of our data are as follows: Data on Election Results at general elections for each MP is obtained from *Electoral Calculus*.[10] Results of By Elections (equivalent to special elections in the US) are taken from UK *Parliamentary Research Papers*.[11] Opinion Polling data is obtained from the *UK Polling Report*. Data on individual MPs including their parliamentary posts, spoken and written contributions is obtained from the MP's profile on the UK Parliament website. Data on the Parliamentary voting behaviour of each MP is obtained from *PublicWhip*. Data on the proposing and signing of Early Day Motions by MP and time period is obtained from the *EarlyDayMotions* website.[12] Data on the Register of Members' Interests is obtained from *TheyWorkForYou* (also available on the parliamentary website). Data on the demographic characteristics in each constituency is obtained from the 2001, 2011, and 2021 UK Censuses, with the demographic characteristics attributed to each election taken from the closest census. As mentioned previously, the demographic characteristics used in the calculation of the predicted votes are those that are available at a constituency level in all three censuses. The summary statistics for the key unscaled and pre-logged data series are given below in Table 1:

[9] An alternative approach introduces an intermediate step, where the instrumented job security calculated in Eq. (3) is used in a full first-stage regression including the control variables $X_{mp,t}$, and the MP-election fixed effects $\theta_{mp,E}$. Our key findings are robust to this alternative approach, with results available on request.

[10] Our results are not driven by changes in electoral boundaries, being robust to the exclusion of parliaments during which constituencies were undergoing boundary changes.

[11] Our findings are robust to excluding MPs elected at By-Elections for the remainder of the parliament of their election, where their majorities may not be a true representation of their future job security.

[12] The Data on EDMs is only available for the period up to and including December 2018, the data on spoken contributions only for the period after May 2006, and the data on written contributions only for the period after May 2014, resulting in reduced observations for analyses using these data series.

Table 1 Summary statistics

	Observations	Mean	S.D	Min	Max
Predicted majority percentage	117,803	18.1	20.5	−55.21	94.1
Majority percentage	117,803	21.3	14.2	0.00	77.1
Effort (Votes Percentage)	117,803	71.6	21.0	1.54	100.0
Effort (Votes & EDM Summed Percentage))	113,398	76.0	24.5	0.25	200.0
Effort (Votes, EDM & Spoken Summed Percentage))	66,719	90.0	28.7	0.25	261.2
Effort (Votes, EDM, Spoken & Written Summed Percentage))	23,432	94.5	28.7	0.35	301.6
N	118,686				

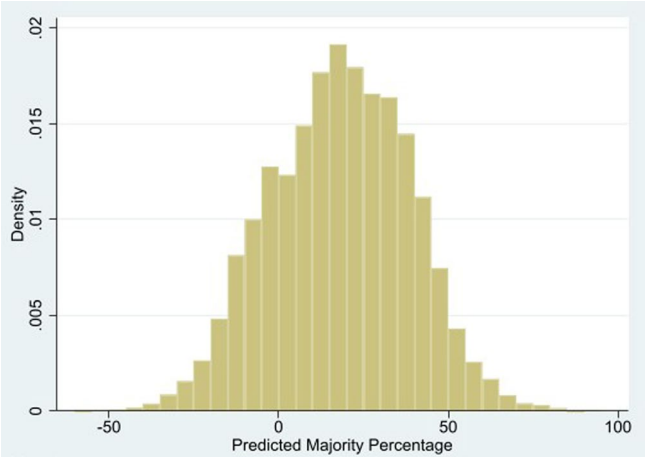

Fig. 2 Distribution of predicted majority percentages

A worked example of the calculation of predicted majority percentage is available in the online appendix, and the histogram in Fig. 2 below displays the distribution of predicted majority percentage across the MPs and time periods of our analyses:

5 Results

5.1 Job security and the opportunity cost of legislative effort

First, we test our initial hypotheses set out in Sect. 3, H_1 and H_{1a}, to establish whether changes in job security impact on levels of legislative effort for UK MPs, and whether there are any non-linearities in this relationship. In this baseline specification, we proxy effort through (log) voting percentages, and, as in all other specifications, instrument job security through fitted predicted majority percentages. Table 2 presents the estimation of

Table 2 Predicted majority and voting percentages results

	(1) Effort (Votes)	(2) Effort (Votes)
Predicted majority	0.231***	0.116*
	(0.039)	(0.052)
Predicted majority^2		0.377***
		(0.082)
MP-election FE's	Yes	Yes
Posts controls	Yes	Yes
Observations	117802	117802
R^2	0.329	0.329

Standard Errors, in parentheses, are clustered at MP level, $*p < 0.05$ $**p < 0.01$, $***p < 0.001$

specifications (1) and (2) with this instrument for job security[13] and proxy for effort, and including the MP-Elections fixed effects ($\theta_{mp,E}$) and Parliamentary Posts controls ($X_{mp,t}$)[14]:

The results in Table 2 show that for the narrowest proxy for effort, job security has a positive impact on effort, even controlling for MP-election specific characteristics. When allowing for potential quadratic effects, the results of the estimations of specification (2) in column (2) show that there is evidence of non-linearities in the relationship, specifically, a U-shaped relationship, given that the range of predicted majorities spans both positive and negative values. Thus, the baseline results are consistent with an opportunity cost mechanism, with MPs who perceive themselves to be more electorally secure facing a lower opportunity cost of exerting legislative effort, even though these results cannot distinguish between the possible alternative allocations of effort.[15]

5.2 Opportunity cost of broader effort

It is clear that the voting proxy for effort used for estimating the results in Table 2 represents only one of the avenues through which MPs can exert effort in legislative activities. It is also likely that, as hypothesis H_2 sets out, the opportunity cost of exerting effort in legislative activities increases with the extent of those activities, and that this should be reflected in the relationship between job security and effort. As the breadth of the exerted legislative effort expands, the opportunity cost of exerting that effort increases, and therefore the impact of any changes in perceived job security should also increase. To address this, Table 3 presents different estimations of specification (2) when the proxy for effort is expanded to be the (log) sum of voting and signing Early Day Motions (EDMs) percentages (column (2)), the (log) sum of voting, signing EDMs and spoken contribution percentages

[13] The full results of the first-stage regressions of predicted party votes and demographics can be found in the online appendix. Our results are robust to excluding constituencies where the Liberal Democrat or Other vote is predicted to either be the winner or runner-up in that constituency, and thus feature in the metric of predicted majority, given the lower predictive power of demographics for votes for these parties.

[14] The full results table including the control coefficients can be found in the online appendix.

[15] Our results are not purely driven by changes in effort amongst MPs with large majorities, being robust to excluding constituencies with a predicted majority of less than 14%, equivalent to the 7% swing definition of a marginal constituency in Lockwood (2011). Alternatively, our results are also robust to excluding from the analysis any constituency that does not change party at a minimum of one general election.

Table 3 Predicted majority and broader legislative effort

	(1) Effort (Votes)	(2) Effort (Votes & EDM)	(3) Effort (Votes, EDM & Spoken)	(4) Effort (Votes, EDM Spoken & Written)
Predicted majority	0.116*	0.183**	0.248***	0.329*
	(0.052)	(0.057)	(0.074)	(0.152)
Predicted majority^2	0.377***	0.195*	0.190*	−0.198
	(0.082)	(0.076)	(0.085)	(0.266)
MP-election FE	Yes	Yes	Yes	Yes
Posts controls	Yes	Yes	Yes	Yes
Observations	117802	113397	66719	23432
R^2	0.329	0.307	0.313	0.367

Standard Errors, in parentheses, are clustered at MP level, $*p < 0.05$ $**p < 0.01$, $***p < 0.001$

(column (3)) and the (log) sum of voting, signing EDMs, spoken and written contribution percentages (column (4)). For ease of comparison, column (1) displays the equivalent results from the previous section, when effort was proxied by (log) voting percentages.[16] In order to ensure that the coefficients are directly comparable across the proxies for legislative effort, we rescale the data for the broader proxies of effort, relative to effort proxied by voting percentage, such that the range of values is equal across the proxies.

The results in Table 3 show that, firstly, the finding of a U-shaped impact of job security on effort is partially robust to broader proxies for effort. When the proxy for effort is expanded to include the signing of EDMs, signing EDMs and spoken contributions or to signing EDMs, spoken and written contributions in the House of Commons, the positive linear impact remains, with evidence of a U-shaped non-linear relationship, except in the case of the broadest proxy for effort - voting, signing EDMs, spoken and written contributions, where there is no significant non-linear relationship. Secondly, the results show that, as the breadth of the effort proxy expands the extent of the impact of job security on effort also increases. For the narrowest proxy for effort, voting percentage, a 1% point increase in predicted majority increases the voting percentage by 0.12%, however, if effort is expanded to include both voting and the signing of EDMs, this increases to 0.18%, to 0.25% when spoken contributions are also included and to 0.33% if written contributions are also included. The coefficients for the non-linear relationship are more consistent across the broader proxies for effort, with the exception of effort proxied by voting, signing EDMs, spoken and written contributions. The results are therefore, again, consistent with an opportunity cost mechanism, with the opportunity cost of exerting legislative effort increasing with electoral vulnerability and the breadth of the exerted effort. It is possible that our results are driven not by a mechanism directly linking job security and effort, but instead by a career ladder or quality mechanism that is correlated with both job security and effort. For example, if better politicians are distributed to constituencies where their party is more secure, and such politicians respond more strongly to changes in their party's performance in opinion polls, then a similar relationship would emerge. Alternatively, MPs may adjust their legislative effort in order to change their probability of climbing the political career ladder. Benedetto and Hix (2007) categorise MPs into groups whose behaviour

[16] The full results table, including the control coefficients, can be found in the online appendix.

is potentially driven by political career ladder incentives vs those who are unlikely to be driven by such incentives, which in turn will partially reflect their 'quality'. They argue that 'Ejected' MPs, who previously served in ministerial roles, or 'Rejected' MPs, who have been passed over for career progression have little hope of future upward career mobility, and therefore do not respond to these incentives. Such 'Ejected' and 'Rejected' MPs are also likely to be of lower quality than other MPs who retain or are appointed to more senior positions. Examining the impact of job security on effort across these groups shows no evidence of a significant difference in the relationship between them and other MPs, suggesting that it is indeed job security that is impacting on effort, rather than potentially correlated political factors.[17]

5.3 Opportunity cost and outside options

In our previous discussion, we argued that our key results were driven by an opportunity cost of time-allocation mechanism. If this is the case, then, as we set out in H_3, the opportunity cost of exerting legislative effort should be higher for individuals with lower outside options. For individuals with higher outside options, the cost of electoral defeat is lower, as they can rely on their higher outside options if they lose their employment as an MP. One indicator of an individual MP's outside options is their level of wealth. Individuals with independent sources of wealth are likely to be less concerned about future employability, as, if they do lose their employment, they have that wealth as a buffer during the ensuing job search. The *Register of Members' Interests* for UK MPs contains details of additional assets owned by MPs, including any properties, aside from their main residence (unless their main residence generates an income), and any shares. Although these are by no means perfect proxies for wealth, they provide some indication of those MPs who are more or less individually wealthy. To isolate any differences in the impact of job security on effort depending on wealth, as would be expected with an opportunity cost mechanism, we calculate three indicators for an individual's level of wealth. We categorise an MP as having 'Higher Wealth' if they (1) report owning additional properties outside of their main residence in the last release of the *Register of Interests*, (2) report owning shares in the last release of the register and (3) report owning both additional property and shares, and vice versa for individuals with 'Lower Wealth'. We then interact these three indicators for the wealth of an individual MP with their predicted majority. In order to simultaneously maximise the breadth of the proxy for legislative effort, and the number of observations, given the more limited availability of data on spoken and written contributions, we proxy effort with the (log) sum of voting and signing Early Day Motions percentages.[18] Table 4 presents the results of the impact of job security on effort, with interactions between the indicators of high and low wealth with the predicted majority of an MP. We also account for any job security invariant impacts of wealth on effort by including the wealth indicators in the specification on their own:

The results in Table 4 show that the positive impact of job security on individual effort is primarily driven by individuals with less wealth. These individuals, who do not own additional property (column (1)), shares (column (2)) or do not own both additional property and shares (column (3)), adjust their effort in response to changes in job security in the expected manner, with increased job security increasing legislative effort. However, for higher wealth

[17] Results available in the online appendix.

[18] Our results are robust to focussing solely on voting percentages as a proxy for effort.

Table 4 Opportunity cost of effort and MPs' wealth breakdown

	(1) Effort(Property as Wealth Proxy)	(2) Effort(Shares as Wealth Proxy)	(3) Effort(Both Property & Shares as Wealth Proxy)
Higher wealth × Predicted majority	0.144	0.197*	0.134
	(0.074)	(0.084)	(0.084)
Higher wealth × Predicted majority^2	0.124	−0.060	−0.121
	(0.133)	(0.160)	(0.185)
Lower wealth × Predicted majority	0.247***	0.228***	0.229***
	(0.072)	(0.069)	(0.068)
Lower wealth × Predicted majority^2	0.019	0.060	0.056
	(0.094)	(0.089)	(0.088)
MP-election FE	Yes	Yes	Yes
Posts controls	Yes	Yes	Yes
Wealth indicator	Yes	Yes	Yes
Observations	95112	95112	95112
R^2	0.310	0.310	0.310

Standard Errors, in parentheses, are clustered at MP level, $*p < 0.05$ $**p < 0.01$, $***p < 0.001$

individuals there is either no significant impact offuture employment. Individuals who are personally wealthy are less concerned about their future employment status, as they can use their wealth to fund their living expenses during any periods of job search, and therefore the opportunity cost of exerting effort in legislative activities is lower, compared to lower wealth individuals. This is confirmed by the average levels of effort, where in all three cases, the average effort is higher for the wealthier category than for the less wealthy category, reinforcing the evidence for a lower opportunity cost for wealthier individuals. It is also worth noting that, once we account for outside options, the previous quadratic relationship no longer applies, and the relationship is now linear, as we would expect is the relationship was primarily driven by the maintenance of non-parliamentary human capital, as we set out in Sect. 3. Further evidence on the opportunity cost mechanism can be seen by comparing the relationship for MPs pre retirement age, whose opportunity cost of defeat is higher, to those post retirement age, whose opportunity cost of defeat is lower. These results can be found in the online appendix, and show that it is indeed pre-retirement age individuals driving the relationship between job security and legislative effort. job security on effort or a smaller and less significant impact, depending on the wealth indicator. These findings are consistent with an opportunity cost of time allocation mechanism, where MPs choose to allocate their time either to retaining their elected position, or to maximising their employability in

5.4 Electoral distance and the opportunity cost of legislative effort

Our results have confirmed that there is a positive impact of job security on legislative effort, primarily driven by an opportunity cost of time allocation mechanism. However, to this point it is unclear whether MPs assess the opportunity cost of legislative effort relative to constituency service, or relative to the maintenance of non-parliamentary human capital. In Sect. 3, we argued that one indicator of which opportunity cost is dominant is

the relationship between the impact of job security on effort, and the distance from the last election. Given short-term, myopic voter memory, as the distance from the last election increases and the closeness to the next election increases, the impact of job security on effort should strengthen as more vulnerable MPs focus to a greater extent on constituency activities (H_{4a}). In contrast, given the depreciation of non-parliamentary human capital over time, as the distance from the last election increases and the closeness to the next election increases, the impact of job security on effort should weaken (H_{4b}). To test these two competing hypotheses we interact predicted majority with the number of periods since the last election. We also include the un-interacted terms for both predicted majority and election distance. Table 5 presents these results:

rom the importance of constituency-focussed activities, is to examine how the relationship between job security and legislative effort changes depending on an individual's ability to maintain their human capital. In some careers, individuals can only maintain their human capital by directly working in that industry, and, of these, a number of them will be incompatible with parliamentary work. For others, while working in the industry is necessary to maintain human capital, MPs are able to do so alongside their parliamentary careers. We cannot observe the maintenance of non-parliamentary human capital through voluntary work, or effort outside of employment. However, one potential proxy for the ability of MPs to maintain their human capital is declarations of paid employment. The Register of Members' Interest used to calculate our proxies for wealth also includes information on whether MPs have taken on paid employment. Whilst we cannot observe the nature of the employment, the presence of paid employment in a previous declaration of members' interest disclosure can act as a proxy for the ability of MPs to maintain their human capital. Therefore, we now interact our predicted majority variables with the presence (or absence) of paid employment in previous declarations of members interests, and then combine this with the higher and lower wealth (outside option) indicator in Sect. 5.3. This gives four groups—(1) Paid Job and Higher Wealth, (2) Paid Job and Lower Wealth, (3) No Paid Job and Higher Wealth and (4) No Paid Job and Lower Wealth. We define higher wealth as those MPs who own both property and shares. Table 6 presents these results:

The results show that, although there is a significant positive relationship for both MPs with and without previous paid employment, the relationship is stronger for those with a paid job, as expected, given that these individuals can more readily maintain their non-parliamentary human capital, and, therefore, face a greater trade-off in their time allocation. Combining the indicator for paid employment with the higher and lower wealth proxies shows that, again, the strength of the relationship is higher for individuals with paid jobs, and there is no impact on higher wealth individuals with paid jobs, who have the highest outside options. One change from our previous findings on outside options is that there is now some evidence of a relationship for higher wealth individuals with no paid job. These findings are not unexpected, given that the presence of a paid job will partially also act as a proxy for outside options, alongside acting as a proxy for the ability to maintain human capital. Therefore, the higher wealth individuals without a paid job will have worse outside options than higher wealth individuals with a paid job.

Whilst the results above provide further evidence on the importance of the maintenance of human capital, they are still currently independent of our examination of electoral distance. Therefore, to combine all of our independent analyses, we finally examine the combination of interactions of the indicators of the presence and absence of a paid job, higher and lower wealth, predicted majority, and distance from the previous election (and its square). Table 7 presents these results:

Table 5 Predicted majority, electoral distance and legislative effort

	(1) Effort (Votes)	(2) Effort (Votes & EDM)	(3) Effort (Votes, EDM & Spoken)	(4) Effort (Votes, EDM, Spoken & Written)	(5) Effort (Votes)	(6) Effort (Votes & EDM)	(7) Effort (Votes, EDM & Spoken)	(8) Effort (Votes,EDM, Spoken & Written)
Predicted majority	−0.019	0.072	0.153*	0.387*	−0.007	0.120*	0.277**	0.479*
	(0.048)	(0.057)	(0.072)	(0.193)	(0.055)	(0.061)	(0.088)	(0.191)
Predicted majority^2	0.214**	0.059	−0.092	−0.178	0.296***	0.096	−0.072	−0.263
	(0.081)	(0.083)	(0.101)	(0.341)	(0.089)	(0.084)	(0.130)	(0.334)
Predicted majority × Periods since election	0.0022*	0.0017	−0.0003	−0.0060	0.0029	−0.0020	−0.0099**	−0.0223**
	(0.0010)	(0.0009)	(0.0010)	(0.0050)	(0.0028)	(0.0025)	(0.0033)	(0.0074)
Predicted majority^2 × Periods since election	0.0011	0.0012	0.0080**	0.0106	−0.0130*	−0.0100	0.0031	0.0173
	(0.0022)	(0.0018)	(0.0026)	(0.0100)	(0.0064)	(0.0054)	(0.0078)	(0.0168)
Predicted majority × Periods since election^2					−0.00002	0.00007	0.00017**	0.00051***
					(0.00006)	(0.00005)	(0.00006)	(0.00014)
Predicted majority^2 × Periods since election^2					0.00032*	0.00027*	0.00012	−0.00012
					(0.00014)	(0.00012)	(0.00015)	(0.00036)
MP-election FE's	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Posts controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Election distance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Election distance^2	No	No	No	No	Yes	Yes	Yes	Yes
Observations	117802	113397	66719	23432	117802	113397	66719	23432
R^2	0.337	0.317	0.331	0.381	0.338	0.318	0.331	0.385

Standard Errors, in parentheses, are clustered at MP level, $*p < 0.05$ $**p < 0.01$, $***p < 0.001$

Table 6 Paid positions, outside options and legislative effort

			(1) Effort (Votes & EDM)	(2) Effort (Both Property & Shares as Wealth Proxy)
Paid job × Predicted majority	0.236**	(0.077)		
Paid job × Predicted majority^2	0.070	(0.097)		
No paid job × Predicted majority	0.175***	(0.053)		
No paid job × Predicted majority^2	−0.006	(0.133)		
Higher wealth × Paid job × Predicted majority			0.106	(0.093)
Higher wealth × Paid job × Predicted majority^2			−0.060	(0.205)
Lower wealth × Paid job × Predicted majority			0.245**	(0.079)
Lower wealth × Paid job × Predicted majority^2			0.081	(0.101)
Higher wealth × No paid job × Predicted majority			0.226*	(0.107)
Higher wealth × No paid job × Predicted majority^2			−0.293	(0.192)
Lower wealth × No paid job × Predicted majority			0.177***	(0.053)
Lower wealth × No paid job × Predicted majority^2			0.001	(0.134)
MP-election FE	Yes		Yes	
Posts controls	Yes		Yes	
Paid job indicator	Yes		Yes	
Wealth indicator	No		Yes	
Observations	95112		95112	
R^2	0.310		0.310	

Standard Errors, in parentheses, are clustered at MP level, $*p < 0.05$ $**p < 0.01$, $***p < 0.001$

These results provide the strongest support for the importance of non-parliamentary human capital maintenance in the impact of job security on legislative effort. Once we account for (1) the extent of an individual's outside options, (2) their ability to maintain their non-parliamentary human capital through paid work and (3) the distance from the previous election (and its square), the only remaining significant positive relationship between job security and legislative effort is for lower wealth MPs with poorer outside options, who have had previous paid employment, and so can maintain their human capital. There is also evidence that this relationship weakens as the distance from the previous election increases, as would be expected if this was driven by the maintenance of human capital, with no evidence of a positive quadratic interaction increasing the strength of the relationship as the next election draws nearer.[19] Therefore, our results provide reduced-form evidence of a positive impact of perceived job security on legislative effort via the maintenance of non-parliamentary human capital.

[19] Examining the coefficients on the interactions between election distance (and its square), and the indicators of paid employment and wealth shows that lower wealth individuals on average decrease their effort as the next election draws nearer, irrespective of their job security, likely as a result of increased constituency activities.

Table 7 Paid positions, outside options, election distance and legislative effort

	(1)	
	Effort(Both Property & Shares as Wealth Proxy)	
Higher wealth × Paid job × Predicted majority	0.202	(0.165)
Higher wealth × Paid job × Predicted majority^2	−0.416	(0.379)
Lower wealth × Paid job × Predicted majority	0.238**	(0.086)
Lower wealth × Paid job × Predicted majority^2	−0.019	(0.113)
Higher wealth × No paid job × Predicted majority	0.047	(0.200)
Higher wealth × No paid job × Predicted majority^2	0.137	(0.384)
Lower wealth × No paid job × Predicted majority	0.139	(0.079)
Lower wealth × No paid job × Predicted majority^2	−0.137	(0.167)
Higher wealth × Paid job × Predicted majority × Periods since election	−0.0117	(0.0124)
Higher wealth × Paid job × Predicted majority^2 × Periods since election	0.0265	(0.0289)
Lower wealth × Paid job × Predicted majority × Periods since election	−0.0062*	(0.0031)
Lower wealth × Paid job × Predicted majority^2 × Periods since election	−0.0093	(0.0075)
Higher wealth × No paid job × Predicted majority × Periods since election	−0.0051	(0.0172)
Higher wealth × No paid job × Predicted majority^2 × Periods since election	−0.0432	(0.0508)
Lower wealth × No paid job × Predicted majority × Periods since election	−0.0089	(0.0047)
Lower Wealth × No paid job × Predicted majority^2 × Periods since election	0.0053	(0.0099)
Higher wealth × Paid job × Predicted majority × Periods since election^2	0.00023	(0.00025)
Higher wealth × Paid job × Predicted majority^2 × Periods since election^2	−0.00047	(0.00059)
Lower wealth × Paid job × Predicted majority × Periods since election^2	0.00012	(0.00007)
Lower wealth × Paid job × Predicted majority^2 × Periods since election^2	0.00031	(0.00016)
Higher wealth × No paid job × Predicted majority × Periods since election^2	0.00012	(0.00038)
Higher wealth × No paid job × Predicted majority^2 × Periods since election^2	0.00054	(0.00122)
Lower wealth × No paid job × Predicted majority × Periods since election^2	0.00019	(0.00010)
Lower wealth × No paid job × Predicted majority^2 × Periods since election^2	−0.00006	(0.00025)
MP-election FE	Yes	
Posts controls	Yes	
Paid job indicator	Yes	
Wealth indicator	Yes	
Election distance interactions	Yes	
Election distance^2 Interactions	Yes	
Observations	95112	
R^2	0.322	

Standard Errors, in parentheses, are clustered at MP level, $*p < 0.05$ $**p < 0.01$, $***p < 0.001$

6 Conclusion

In this paper, we examined the mechanisms driving the impact of perceived job security on politicians' legislative effort by exploiting the variation in predicted job security among Members of Parliament (MPs) in the United Kingdom. To isolate the impact of job security

on effort, from any potential reverse causal impact of effort on job security, we constructed an instrument for the job security of an individual MP, which would not be impacted by their effort. We instrumented the vote for an individual MP by calculating predicted vote shares based of the demographic makeup of their constituency, which we then interacted with changes in the performance of political parties in opinion polls, both of which are exogenous to the individual effort of a given MP.

We find that the impact of job security on MPs' legislative effort is generally positive, with increased perceived job security leading to increased legislative effort by MPs, with some evidence of a U-shaped relationship for some proxies for effort. We show that this relationship is primarily driven by differences in the opportunity cost of exerting legislative effort across MPs with different levels of electoral vulnerability, rather than by the incentives for political career ladder climbing. We find that, as expected, the impact of job security on legislative effort increases with the breadth of the exerted effort, and is primarily driven by individuals who are less personally wealthy and therefore have lower outside options and face a greater cost of electoral defeat. We show that this relationship is strongest, on average, closest to elections, weakening as the distance from the previous election increases to a point, before then starting to increase again as the next election draws nearer. Finally, we present reduced-form evidence that the opportunity cost mechanism underlying the impact of job security on effort is driven primarily by the opportunity cost of investing time in the maintenance of non-parliamentary human capital, rather than by a focus on improving electoral prospects through constituency service.

Our results have implications for UK legislative policy: If governments and voters desire greater engagement in the legislative process from their representatives, then action would be needed to reduce the costs of electoral defeat, particularly for individuals with lower outside options, or a greater depreciation rate of non-parliamentary human capital. This has been recognised by MPs themselves, who argued in February 2023 that the current payment upon losing their office in a general election was insufficient, and disincentivised individuals from less advantaged backgrounds from becoming MPs (Administration, 2023). In turn, this report, and the broader discussions on MPs' payments and remuneration, resulted in a doubling of the 'Loss of Office Payment' in July 2023, to take effect at the following general election (IPSA, 2023). Future research could seek to examine whether this change to the costs of defeat does result in changes in MPs' behaviour, in particular, a weakening of the link between job security and effort among MPs with lower outside options.

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