Bureaucratic Capacity and Urban Planning: Evidence from Los Angeles [*]

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Abstract

Using data from the Los Angeles City Planning Commission, we document the role of bureaucratic capacity in influencing urban development outcomes. We show that public opposition and familiarity of cases matter. Cases that are fairly typical are more likely to sail through approvals, but cases exhibiting peculiar features are less likely to be approved and more likely to be delayed. We measure familiarity by how semantically unique the proposal is compared to other proposals of its category. A one standard deviation increase in uniqueness decreases the log odds of approval by 0.228. Public opposition matters as well: a doubling of the number of opposition letters reduces the log odds of approval by 0.209. The results are consistent with a model of bureaucratic choice with public monitoring, reputational risk, and cognitive constraints.

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JEL Classification: D73, R14, R38, R52.

1   Introduction

Since Simon (1955), the concept of bounded rationality has reshaped how we understand decision-making. Rather than assuming fully informed optimization, actors operate with limited attention, information, and computational capacity. Most decisions—indeed, most organizational arrangements—exist precisely to manage these limits. For an organization or a policy to function, it must economize on information, distributing attention and routinizing choice across actors (Cyert and March, 1963). Rules, hierarchies, and standards function as compression devices that simplify complexity so boundedly rational agents can act. Institutional design, in this sense, involves a trade-off: reducing informational complexity makes collective action possible, but oversimplification can constrain discretion and innovation.

Still, Simon's insight is more descriptive than operational. His original formulation was broad, leaving open what it means to "satisfice" or how cognitive constraints work in practice. Subsequent research has attempted to formalize bounded rationality through explicit limits on optimization or information processing. In one branch, agents are modeled as satisficers, engaging in constrained search over feasible options (Stigler, 1961; Rubinstein, 1986; Salant, 2011). Another tradition treats cognition as a scarce resource allocated across noisy or incomplete signals (Radner, 1993; Van Zandt, 1999; Sims, 2003; Hébert and Woodford, 2023). Recent approaches impose restrictions on reasoning itself. Agents cannot process all states or clauses within a choice architecture and therefore use simplified mental representations (Zhang and Levin, 2017; Jakobsen, 2020). Simulation studies extend these ideas to dynamic settings, showing that when decision-makers can only make local, incremental improvements (Levinthal, 1997; Marengo and Dosi, 2005; Richters, 2021), outcomes depend as much on the structure of the decision landscape as on individual preferences or rules.

These theoretical advances have added clarity, but translating them into empirical work remains challenging. Because cognitive limits are inherently unobservable, they can only be inferred indirectly through deviations from idealized rationality. Behavioral economists have modeled this process as probabilistic optimization, where agents make noisy or limited best responses (McKelvey and Palfrey, 1995; Camerer et al., 2004). Experimental studies have documented satisficing and cognitive constraints (Güth, 2010; Lim et al., 2014; Alaoui et al., 2020), but remain confined to stylized laboratory environments. Systematic evidence from field settings is scarce (Kirman, 2010; Fehr and Schmidt, 1999), leaving open how bounded rationality operates in practice. As a result, the empirical literature lacks large-scale, observational analyses that trace how cognitive constraints manifest in organizational decision environments.

This paper addresses that gap. We study bounded rationality in the empirical setting of the Los Angeles City Planning Commission (LA CPC), an administrative body that decides which development projects proceed in the city. Commissioners evaluate proposals that combine legal, architectural, and community considerations under tight time limits and public scrutiny. Each case requires filtering substantial information while balancing political and legal considerations. The public nature of the process generates a rich paper trail: every meeting produces agendas, minutes, and written comments that record both the information presented and the decisions made. We use these records to construct a measure of semantic uniqueness by converting the text into high-dimensional vector embeddings. Cases that use similar language cluster together, and a proposal's uniqueness is defined by how far it lies from the center of its cluster. Projects with greater semantic distance impose higher cognitive effort, as commissioners must interpret unfamiliar items.

At its core, the Commission's task reflects a classic principal-agent problem. Commissioners act as agents on behalf of the city, charged with advancing development

while ensuring compliance with zoning rules and public expectations. For each proposal, commissioners decide whether to delay, modify, or approve a project, subject to two constraints. First, they face oversight risk: every decision is publicly scrutinized by residents, community organizations, and the press. Excessive leniency or excessive postponements can cause political backlash. We capture this dimension by applying sentiment analysis to public correspondence as an indicator of monitoring pressure. Second, commissioners face cognitive limits: each meeting includes dozens of cases that vary in legal and technical complexity. We proxy for the cognitive effort in interpreting proposals using semantic uniqueness, which measures how linguistically similar each proposal is relative to the kinds of cases the Commission typically encounters.

We use this framework to estimate how cognitive limits and public oversight correspond to approval outcomes using an ordered logit specification. The results reveal a consistent pattern. Less familiar projects face a penalty: controlling for project type, council district, and case characteristics, a one-standard-deviation increase in semantic uniqueness reduces the log odds of full approval by about 0.228. Routine items, by contrast, move easily through the process. Placement on the Commission's consent calendar, which groups standard cases for joint approval, nearly doubles the probability of full approval. Public opposition exerts a strong negative influence—doubling the number of opposition letters reduces the log odds of approval by 0.209—but the number of support letters provides little offsetting benefit.

These dynamics are particularly consequential in the context of urban development, where regulatory decisions directly shape the pace and composition of housing supply. A large literature has shown that stringent land-use regulations constrain

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construction and contribute to high housing costs.[1] Yet much less is known about the *regulatory production process* itself—how administrative capacity, attention, and procedural design influence which projects advance and which stall. By showing that cognitive and oversight constraints systematically affect approval outcomes, our analysis provides evidence on a key mechanism linking bureaucratic performance to housing supply.

Our study contributes to two related areas of research. First, the paper provides an empirical grounding for the theory of bounded rationality by documenting cognitive constraints in real organizational settings. Using policy documents, we extract and quantify information to capture latent cognitive dimensions such as familiarity, complexity, and attention. In doing so, the paper offers a general framework for quantifying the cognitive costs of decision-making, which can be applied across institutional contexts to examine how information-processing limits shape organizational behavior. Second, it extends models of bureaucratic behavior by treating regulatory outcomes as functions of cognitive capacities as well as incentives. Whereas prior work has focused on malformed incentives or political capture (e.g., Prendergast, 2003; Carpenter and Krause, 2012; Busuioc and Lodge, 2016), our results show that even in the absence of explicit bias, limited processing capacity can produce variation in outcomes. The analysis further contributes to the literature on urban regulation and housing supply (e.g., Gyourko and Molloy, 2015; Molloy, 2020) by suggesting that the pace of development depends not only on statutory constraints but also on the institutional capacities of the regulatory apparatus itself.

The remainder of the paper is organized as follows. Section 2 situates our analysis within the literature on bureaucratic decision-making and develops a simple model

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[1]See, for example, Glaeser and Ward (2009), Hilber and Vermeulen (2016), Ganong and Shoag (2017), Brueckner and Singh (2020), and Gabriel and Kung (2025). See Gyourko and Molloy (2015) and Molloy (2020) for further reviews of the literature.

that formalizes the trade-off between oversight risk and cognitive cost. Section 3 describes the Los Angeles City Planning Commission and the construction of the text-based dataset. Section 4 outlines our empirical methodology and variables, including the computation of semantic uniqueness. Section 5 presents the main results and robustness checks, and Section 6 concludes.

2　A Basic Model

Two recurring constraints arise in bureaucratic decision-making: reputational risks under public oversight and cognitive limits in processing complex proposals. We review these institutional features of the decision environment, then present a simple model in which commissioners choose actions and effort under both constraints. The model shows how these trade-offs generate a systematic bias against unfamiliar or contested projects, while routine items sail through with little resistance.

2.1　Oversight, Cognition, and Bureaucratic Choice

Bureaucratic decision-making is shaped by the limited contractibility and imperfect measurability of tasks, which create persistent incentive problems (Dixit, 2002). Public officials therefore operate under binding institutional and cognitive constraints that systematically shape their choices.

One constraint arises from the cost of oversight. Establishing and operating monitoring institutions is expensive (Huber and Shipan, 2000; Damonte et al., 2014). Consequently, oversight depends on indirect signals. Since the public cannot directly observe bureaucratic effort or expertise, it relies on "fire alarms" such as complaints or organized opposition (Prendergast, 2003). Such monitoring is asymmetric; failures generate complaints, while successes rarely do. This asymmetry makes bureaucrats

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rationally defensive, leading them to minimize exposure by avoiding novel or controversial decisions. Moreover, accountability is rarely unitary. Agencies are monitored by legislators, courts, media, and citizens, whose expectations are often incompatible (Black, 2008; Maggetti and Papadopoulos, 2018). Such polycentric accountability multiplies reputational risks and encourages defensive choices over efficiency (Carpenter and Krause, 2012; Gilad et al., 2015; Busuioc and Lodge, 2016). Opposition letters, in this sense, are not merely signals of constituent concern but reputational threats.

A second constraint arises from the internal limits of decision-makers. Officials cannot fully process all information and must selectively allocate scarce attention (Simon, 1955; Sims, 2003; Besley and Ghatak, 2003; Hébert and Woodford, 2023). Unfamiliar proposals therefore impose higher cognitive costs and are more likely to be screened out, pushing bureaucrats towards routine or standardized options (De Francesco et al., 2012; Jakobsen, 2020). Goal ambiguity further complicates evaluation. When standards are unclear, performance falls and risk aversion rises (Anderson and Stritch, 2016). In such settings, the safest course is to stress procedural appropriateness or technical diligence, often at the expense of innovation (Gilad, 2015; Duvanova, 2012).

Because the risks are concentrated while the benefits are diffuse, bureaucrats are incentivized to delay or modify proposals even when those projects may generate social value. The result is a systematic bias: recognizable, routine projects advance, while novel or contested ones are sidelined regardless of their potential.

2.2   Model

Each commissioner chooses an action $a \in \{0, 1, 2\}$, where $a = 0$ denotes delay, $a = 1$ denotes modification, and $a = 2$ denotes full approval. The commissioner may also exert effort $e \geq 0$, representing the diligence devoted to evaluating and justifying a project. Effort simultaneously increases the cognitive burden of processing unfamiliar projects and decreases the expected penalties from oversight.

Two observable project attributes matter:

- **Unfamiliarity** $\delta \geq 0$: Low values correspond to routine, standardized projects; high values correspond to unusual, novel, or hard to evaluate proposals.

- **Opposition** $\chi \geq 0$: The volume of opposition letters received, which increases the salience of oversight.

The commissioner's utility is

$$U_A(a, e, \delta, \chi) \;=\; B(a) \;-\; C(e, \delta) \;-\; M(a, e, \chi) \tag{1}$$

where:

- $B(a)$ is the baseline benefit from taking action a. These benefits can be interpreted broadly, but in general, approving projects creates visible productivity. We assume $B(2) \geq B(1) \geq B(0)$, so that in the absence of processing costs or oversight risk the commissioner would prefer more approvals.

- $C(e, \delta)$ is the information-processing cost, increasing in both effort and unfamiliarity ($C_e > 0$, $C_\delta > 0$). This term captures the cognitive demands of evaluating non-routine projects. As unfamiliarity δ rises, commissioners face greater goal ambiguity (unclear standards for what counts as an acceptable project) and

bounded rationality constraints (limited attention to fully process all pieces of the project).

- $M(a, e, \chi)$ is the monitoring penalty function from the reputational, political, or legal cost associated with taking action a with effort e when opposition intensity is χ. It is increasing in approval intensity ($M_a > 0$) and in opposition ($M_\chi > 0$), but decreasing in effort ($M_e < 0$). Decreasing in e reflects the idea that additional due diligence makes decisions more defensible under scrutiny, thereby reducing expected penalties.

For any given action a, the commissioner chooses optimal effort e^* satisfying the first-order condition

$$C_e(e^*, \delta) = -M_e(a, e^*, \chi). \tag{2}$$

The commissioner chooses effort so that the marginal cost of diligence offsets the marginal reduction in expected monitoring penalties. Greater unfamiliarity raises the burden of processing, while higher levels of opposition increase the salience of oversight.

To capture the joint choice of action and effort, we impose a mild regularity so that monitoring responds in the intuitive way, where stronger approval requires greater diligence under scrutiny, and opposition makes diligence more consequential by increasing how much it reduces expected penalties. Formally, the restrictions

$$M_{ea}(a, e, \chi) < 0$$
$$M_{e\chi}(a, e, \chi) < 0$$
$$C_{e\delta}(e, \delta) > 0$$

imply that optimal effort responds monotonically: e^* increases in action a and oppo-

sition χ, but decreases in unfamiliarity δ. This means that approving a contested project requires additional diligence to limit expected penalties, while unfamiliar projects make each unit of diligence more costly. After selecting the optimal effort e^*, the commissioner then chooses the action a that maximizes U_A^*, evaluating processing costs and monitoring penalties at e^*.

2.3 Comparative Statics

We derive two simple predictions.

Proposition 1. *Unfamiliarity reduces approvals.*

Holding opposition χ fixed, higher unfamiliarity δ reduces the probability that the commissioner chooses full approval. Since $C_\delta > 0$, greater unfamiliarity raises the processing cost $C(e, \delta)$, making each unit of effort more expensive. Because approving an unusual project also requires more diligence to withstand scrutiny, unfamiliarity couples higher approval outcomes with prohibitively costly effort. Commissioners therefore choose modification or delay as δ rises. Projects on the consent calendar correspond to $\delta \approx 0$, implying minimal processing costs $C(e, 0)$ and low baseline monitoring penalties. Routine projects therefore require little effort to justify and face low scrutiny, making them strictly more likely to receive full approval than otherwise comparable non-consent items.

Proposition 2. *Opposition reduces approvals.*

Higher opposition χ reduces the probability that the commissioner chooses full

approval. Since $M_\chi > 0$, greater opposition raises the expected monitoring penalty $M(a, e, \chi)$, reflecting the heightened likelihood of ex post scrutiny. Commissioners can respond by increasing effort to reduce these penalties, but additional diligence is costly and cannot fully neutralize political or reputational blowback. As a result, when opposition is substantial, the safer course is to shift toward modification or delay rather than approve a contested project.

3 Data

3.1 Institutional Background

The Los Angeles planning and approvals process for urban development is a multi-layered process that requires the input of multiple agencies. If a development is "by-right", meaning that it conforms to all zoning regulations within its applicable zone, then development can proceed with a permit from the Department of Building and Safety. If, however, the planned development requires an exception to the zoning code, or has a planned purpose not normally allowed by the zoning code, then approval needs to be obtained from the Planning Department and potentially from the City Planning Commission (CPC).

The LA CPC is a nine member administrative body with members appointed by the Mayor of LA and confirmed by the City Council. The CPC is responsible for reviewing citywide zoning changes, approving conditional use permits for large developments, and handling appeals of decisions made by lower bodies. The LA CPC is the second highest planning agency within the City of Los Angeles. Its decisions on appeals from lower bodies are final, and initial determinations made by the CPC

can only be appealed to the City Council.

The CPC meets approximately every two weeks. The agenda for each meeting is set by the Commission itself and made available to the public at least seven days before each meeting. After each meeting, the meeting minutes are published online. The minutes record the order of discussion, the members present, the motions made on each agenda item, and the votes made on each motion. Motions are passed by majority rule, subject to a quorum of five members present. In addition, members of the public are allowed to submit comments on any agenda item either in writing or in person during the meeting.

3.2 Data Acquisition

The Los Angeles Planning Department's website maintains robust public documentation of City Planning Commission Meetings. For each meeting, the agenda, minutes, and any supplemental documents relevant to the meeting (letters from the public, traffic assessments, architectural reports, etc.) are available for download as PDF files.[2] We downloaded these documents for all City Planning Commission meetings from May 10th, 2018 to December 19th, 2024. This resulted in documentary data for 153 meetings, covering 1,497 agenda items, with 6,447 supplemental documents, spanning 23,633 pages of PDF documents. Download occurred on April 10th, 2025.

Since we are primarily interested in bureaucratic decision making, we limit our attention to the agenda items that require a decision from the board. These are identified by agenda items titled according to their Planning Department case numbers, which have a standardized format of "[CASE PREFIX]-[YEAR]-[SERIAL NUMBER]-[CASE SUFFIXES]". Other agenda items include items like "Director's Report" and

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[2]As of August 26th, 2025, these documents are available at the URL: `https://planning.lacity.gov/about/commissions-boards-hearings`.

"General Public Comment" which do not require any decisions on the part of the board. Altogether, there were 727 agenda items requiring a decision from the board, as identified by their Planning Department case numbers.

A typical agenda item is a request from a developer to approve a development plan that goes beyond what the site's zoning designation would allow, or an appeal of a previously approved plan. Figure 1 shows an example of an agenda item. The case number is DIR-2019-6048-TOC-SPR-WDI-1A. This was a project that was initially approved by the Director of Planning (DIR). The project was granted bonuses under the Los Angeles Transit Oriented Communities program (TOC), the project requires a site plan review (SPR), and the project was granted a waiver of dedications and improvements (WDI). However, this previously approved plan was appealed (1A), and the appeal is now being considered by the City Planning Commission. In addition to the information contained in the case number, the agenda document shows additional information such as the Council District that the project is located in and other specific details about the project proposal.

Figure 2 shows the associated minutes for this agenda item. From the minutes, we can see that the appeal was granted in part and denied in part. The CPC upheld the Director of Planning's previous decision, but additional conditions were applied, thus allowing the project to move forward as long as the developer adheres to the new conditions. This outcome, the partial granting of an appeal or the approval of a project with modifications, is common but not the only kind of outcome. Sometimes, the applicant's requested actions are granted in their entirety without additional conditions or modifications. Rarely, the requested actions are denied entirely. A more common occurrence than denial is that the CPC puts the decision off to a later date.

Figures 3 and 4 show examples of letters submitted by the public in support of and

in opposition to the above project. The support letter emphasizes how the project will ease traffic, reduce air pollution, and increase housing availability. The opposition letter emphasizes concerns about displacement and how the proposed units will be unaffordable to current residents of the neighborhood. These letters typify the kinds of concern expressed by community residents in this dataset; however, the number of letters that this project attracted is atypical (DIR-2019-6048 just happens to be a particularly controversial project). We will discuss the distribution of support and opposition letters across projects later in Section 4.

3.3   Data Extraction

The documentary data provides a wealth of information about CPC cases and their outcomes. However, the information is locked within textual data that is difficult to extract using traditional methods. For example, traditional NLP methods based on token and pattern matching would have a hard time comparing the agenda to the minutes and determining whether the requested actions were approved, partially approved, approved with conditions, denied, or whether the decision was postponed to a future date.

To extract usable features from the textual content more robustly, we make use of OpenAI's `gpt-4o` generative language model. For example, the model can be asked to read the text of the agenda, read the text of the minutes, and explain what the result of committee's proposed motion was in terms of its implications for the development project—was the project approved, partially approved or approved with conditions, denied, or was the decision postponed? The methodology and prompts we used to perform the data extraction are described in detail in the appendix. In this section, we will instead focus on the data features that were extracted from the text.

Agenda items. For each agenda item, we extracted the following information from the text:

- Agenda item number (used primarily for identification);
- Item title (for cases requiring a decision, this is always a Planning Department case number);
- Short AI-generated summary of the agenda item's content;
- The Council District(s) to which the item applies.

Minutes. For each agenda item, we extract the following information from its minutes text:

- Short AI-generated summary of the deliberations and the motion that was ultimately voted on;
- Implication of the motion for the proposed project: were the requested actions approved, approved in part or with conditions and modifications, denied, or were deliberations continued to a future date?
- Result of the vote (whether the motion passed or failed);[3]
- Vote tallies: the number of ayes, nays, absences, abstentions, and recusals.

Supplemental documents. For each supplemental document, we extract the following information from its text:

- Type of document: whether it is a letter or petition, a technical modification or procedural matter, a scientific or technical report (traffic, environmental, etc), or a credentials document (CV, resume, biography, etc);

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[3]Note that a motion passing is not the same as the project getting approved, nor is a motion failing the same as the project getting denied. A Member may move to deny the project's requested actions, or move to accept an appeal of a previously approved project, in which case the motion passing implies a denial of the project. These nuances highlight why LLMs are helpful in the data extraction process.

- Which agenda item(s) it references;

- Short AI-generated summary of the document contents;

- Support or opposition: Whether the document supports, opposes, or is neutral towards the requested actions in the referenced agenda item(s).

The resulting dataset contains 727 agenda items with motions voted on by the CPC. Table 1 shows the distribution of the motion outcomes by the unanimity of the vote. Two important facts emerge about the CPC process. First, a minuscule number of projects are denied outright (1% of all cases). Rather than being denied, a more common occurrence is that the decision is postponed to a later date (15% of cases) or the requested actions are only partially approved or approved with conditions or modifications (30% of cases). Second, most decisions were unanimous (91% of all cases). Because of these two facts, we do not view disagreement *within* the board as a significant source of friction in moving development projects through the pipeline. Moreover, few projects are denied outright, so the impact of CPC hearings on final outcomes must come through either i) a slowing down of the process due to having to wait for the decision, which itself may be delayed multiple times; or ii) changes to the project plan that potentially add cost or time to the development, or which could dissuade the developer from even moving forward with the project. Our primary analysis will therefore focus on the bureaucratic factors which lead to either delayed decision making or attaching conditions and modifications to the project proposal.

4 Methodology

We model the CPC hearings as having three possible outcomes:

0. The project is denied or the decision is postponed;

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1. The project is approved in part or with conditions or modifications;

2. The project is approved.

Each project proposal i is assumed to have a latent quality variable y_i^* which determines the likelihood of the three outcomes. y_i^* is modeled as a linear function of observed project characteristics and bureaucratic factors, $\mathbf{X}_i$, plus an error term ϵ_i:

$$y_i^* = \mathbf{X}_i \beta + \epsilon_i \tag{3}$$

The latent quality of the project proposal determines its outcome at the CPC hearing. Let $y_i \in \{0, 1, 2\}$ denote project i's outcome. The relationship between y_i^* and y_i is as follows:

$$y_i = \begin{cases} 0 \text{ if } y_i^* < \mu_0 \\ 1 \text{ if } \mu_0 \leq y_i^* < \mu_1 \\ 2 \text{ if } \mu_1 \leq y_i^* \end{cases} \tag{4}$$

with $\mu_0 < \mu_1$. The model is therefore an ordered logit model, and the outcomes are monotonic in $\mathbf{X}_i \beta$. The parameters β, μ_0, and μ_1 are estimated by maximum likelihood.

4.1 Explanatory Variables

We now turn to discussing the explanatory variables we include in the model.

Semantic uniqueness. In that one of our goals is to quantify the role of bureaucratic frictions in the CPC approvals process, we here develop a concept which we

call "semantic uniqueness". At a high level, semantic uniqueness is designed to capture how unique an agenda item is relative to other agenda items that the CPC is accustomed to hearing. Our hypothesis is that agenda items which are highly unusual may be less likely to be approved, and more likely to be approved with conditions or denied or delayed. We thus expect to estimate a negative coefficient on semantic uniqueness.

To compute a measure of semantic uniqueness, we first calculate the semantic embedding of each agenda item using OpenAI's `text-embedding-3-small` embeddings model.[4] For each agenda item, the model returns a 1,536 dimensional numerical vector that represents the semantic meaning of the text. Two agenda items with very similar proposals will have embeddings that are close to each other, while two agenda items with very different proposals will have embeddings that are far away from each other.

Because `text-embedding-3-small` was trained on a general corpus of documents, not specialized to the topic of municipal planning and zoning, not all 1,536 dimensions may be relevant for capturing the important differences between our agenda items. We therefore use principal components analysis to extract the 10 linear combinations of these dimensions which explain the most variance in our corpus. Figure 5 shows the scree plot of the principal components analysis. By the 10th principal component, there are diminishing returns to including more components.

After reducing the embeddings down to 10 dimensions, we group the agenda items into three clusters using K-Means clustering. Identifying clusters in our data is important because the CPC handles many different types of cases, and the language used could be very different across different case types. For example, the language used in

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[4]For an introduction to the concept of embeddings, see Mikolov et al. (2013) and Le and Mikolov (2014).

a case involving the demolition of an existing building followed by the reconstruction of a multifamily home would be very different from a request for a conditional use permit to operate a school. Thus, it only makes sense to measure semantic uniqueness within a set of similar case types.

Figure 6 shows a scatter plot of the agenda items according to their first two principal components, colored by cluster. Cluster 0, the largest cluster, consists mainly of proposals to build new buildings. Cluster 1 consists mainly of citywide code amendments or plan updates. Cluster 2, the smallest cluster, consists primarily of requests for conditional use permits (i.e. requests to utilize facilities for purposes not allowed by right within the zoning designation.)

To measure the semantic uniqueness of an agenda item, we calculate the distance between the agenda item's 10-dimensional PCA-reduced embedding to its cluster's centroid. We chose Mahalanobis distance because it accounts for the correlation structure of the reduced embedding space (Rencher and Christensen, 2012, p. 93). A simple Euclidean distance assumes that each principal component is uncorrelated and equally informative, and even if rescaled by per-dimension variance, it would still treat dimensions as independent. In contrast, the Mahalanobis distance rescales and rotates the coordinate system so that correlations between dimensions are removed. The estimated coefficient are interpreted as the change in log odds associated with moving one standard deviation farther from the cluster centroid. This provides a scale-free and cluster-comparable measure of uniqueness. A value of 1.0 indicates that an agenda item lies one standard deviation away from its centroid, regardless of which cluster it belongs to or how dispersed that cluster is in the original embedding space. In addition to including the Mahalanobis distance to the cluster centroid as a measure of semantic uniqueness, we include fixed effects for each cluster. This allows each cluster to have a separate baseline probability distribution over outcomes.

Using our measure of semantic uniqueness, we can get a sense of which cases are most atypical for each cluster. In cluster 0, which contains mostly proposals for new buildings or the redevelopment of existing buildings, the most atypical case was one proposing to convert a 4,800 square foot single family home into a congregate living health facility with 18 beds. In cluster 1, which contains mostly plan amendments, the most atypical case was one requesting a plan amendment to allow a specific hotel to sell a full line of alcoholic beverages. In cluster 2, which contains mostly requests for conditional use permits, the most atypical case was one requesting to merge six lots into three containing a sanctuary, an eldercare facility, a childcare facility, and 10 condominium units, as well as a requirement to approve a new haul route for moving earth. These examples show that cases with high semantic uniqueness indeed contain idiosyncrasies which are uncommon for their case types.

Perplexity. Semantic uniqueness measures how unusual a proposal is relative to other cases of similar type. In addition to that, we also try to measure how confusing or hard to understand the proposal is in general. To do this, we ask `gpt-4o` to summarize each agenda item, then we measure the perplexity of the response. In language models, perplexity is a measure of how uncertain the model is about its response. It is measured as the exponent of the response's cross-entropy (i.e. the negative mean of the output tokens' conditional log probabilities.[5]) A perplexity of 1 indicates that the model has no uncertainty about its output, while a higher perplexity means the model is more uncertain.

Agenda order. We also hypothesize that the order in which a case appears in the agenda may matter for its outcome. Note that we use the order in which the case

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[5]See Jurafsky and Martin (2009).

appears in the agenda, not the order in which the case was discussed at the actual meeting. The committee chair has the ability to discuss agenda items out of order, and this may be endogenous to the meeting outcomes, so we focus on the order in which the item appears in the agenda published prior to the start of the meeting.

Number of agenda items. We hypothesize that the number of items on the agenda can have an effect on outcomes. In particular, we hypothesize that a case is more likely to be postponed if there are a large number of items on the agenda.

Consent calendar. The Los Angeles CPC utilizes a practice for streamlining meetings known as the "consent calendar". The consent calendar takes multiple agenda items and groups them into a single motion that the committee votes on together as a whole. The consent calendar tends to include cases that the committee chair has deemed non-controversial and therefore not requiring separate discussion. The consent calendar is published *before* the meeting starts, and items can be taken off the consent calendar during the meeting. We hypothesize that being on the consent calendar significantly predicts approval.

Number of support and opposition letters. We hypothesize that the amount of public support and public opposition matters for hearing outcomes. We hypothesize that greater public support improves a proposal's probability of being approved, whereas greater public opposition increases the likelihood that the proposal is denied, delayed, or approved with conditions. We include public support and public opposition as two separate explanatory variables to allow for heterogeneous impacts of support vs. opposition. Note that a proposed project can receive multiple letters both in support and in opposition. We measure public support as the log base 2 of the number of letters written in support, and we measure public opposition as the

log base 2 of the number of letters written in opposition, as discussed in Section 3. Figure 7 shows the distribution of the number of letters in support and in opposition across cases.

Council districts. Council districts may matter for case outcomes for a variety of reasons. For one, although City Planning Commission members are appointed from a variety of professional backgrounds, most of them come from backgrounds of urban planning, public service, real estate development, or community advocacy. A CPC member, despite best efforts to remain impartial, may therefore still be influenced by the specific politics of the council district. For another, the Los Angeles City Council has veto power over City Planning Commission decisions, and the Council usually defers to the member whose district the project is located in for such decisions. CPC members may therefore be cognizant of the opinions of the project district's council member when making their decisions. To control for these possibilities, we include council district fixed effects as explanatory variables.

Case suffixes. As discussed in Section 3, case suffixes indicate the types of entitlements requested or required by the project, as well as other project indicators. In the data, there are 75 unique suffixes, some of which are quite sparsely populated, which is problematic for our dataset of 727 observations. We therefore collapsed the suffixes into fourteen logical groups with fixed effects for each. The largest suffixes by frequency were retained as their own buckets, and the remaining were grouped according to similarity in their legal descriptions and procedural functions (e.g., land use entitlements, administrative adjustments, housing-related incentives). The suffix groups span fourteen case categories: Appeals; Administrative adjustments; Conditional use permits; Density bonus; Housing Crisis Act; Master conditional use permits; Devel-

opment reviews; Land use entitlements; Specific plan project permit compliance; Site plan review; Transit Oriented Communities; Housing Crisis Act vesting; and other items.

5   Results

Table 2 reports the results from the ordered logit regression. To main coefficient of interest is the effect of semantic uniqueness on case outcome. Four specifications are presented which show the effect of progressively adding more explanatory variables to the regression. The coefficient on semantic uniqueness is robust to the gradual inclusion of more and more confounding variables. Importantly, by including suffix, semantic cluster, and council district fixed effects, we show that the effect of semantic uniqueness on case outcome is not driven by selection on case type or geography.

The results suggest that evaluating proposals is cognitively demanding, and unfamiliar ones are harder to process. The coefficient on semantic uniqueness is negative and statistically significant across specifications, indicating that unfamiliar cases are less likely to be approved outright, and more likely to be approved with conditions or delayed or denied. In the full model, a one-standard-deviation increase in semantic uniqueness decreases the log odds of full approval by 0.228 ($p < 0.05$). By contrast, being placed on the consent calendar nearly doubles the odds of full approval (1.42, $p < 0.01$). These results demonstrate the measurable penalty that unfamiliar projects face from imposing higher cognitive costs on commissioners. Meanwhile, routine consent calendar items move through the process almost automatically. Other institutional factors such as agenda order, agenda length, and agenda perplexity are small and statistically insignificant, indicating that bureaucratic frictions may stem less from meeting logistics than from project familiarity or project typicality.

Commissioners also weigh the effects of opposition on reputational and political exposure. The results indicate that doubling the number of opposition letters decreases the log odds of approval category by 0.209 ($p < 0.01$). In contrast, the coefficient on support letters is small and statistically insignificant. Commissioners appear systematically more sensitive to community opposition than to community support, perhaps reflecting a defensive orientation in their decision-making.

Table 3 reports the marginal effects, which can be interpreted as the predicted effect on outcome probability for a one unit change in the regressor, averaged over cases. The results indicate that a one standard deviation increase in semantic uniqueness reduces the average probability of full approval by about 4.8% ($p < 0.05$), while raising partial approval by about 2.0% ($p < 0.05$) and denial/postponement by 2.8% ($p < 0.05$). Likewise, for opposition letters, doubling their number lowers the average likelihood of approval by about 4.4% ($p < 0.01$), and increases partial approval by 1.9% ($p < 0.01$) and denial/postponement by 2.6% ($p < 0.01$). Placement on the consent calendar has the opposite effect. Full approval increases by about 30.2% ($p < 0.01$), partial approval decreases by 12.7% ($p < 0.01$), and denial/postponement decreases by 17.5% ($p < 0.01$).

To assess the robustness of our findings to omitted variable bias, we follow the approach of benchmarking selection on unobservables against selection on observables (Altonji et al., 2005). If adding a rich set of controls barely shifts the coefficient of interest while substantially increasing explanatory power, then unobservables would have to be implausibly more important than observables to overturn the result (Oster, 2019). To reduce the coefficient to zero would require unobservables to be more than six times as strongly correlated with the outcome as the included covariates ($\delta = 6.12$), suggesting the results are unlikely to be driven by omitted variables.

Overall, these results are consistent with our central argument that bureaucratic

decision-making at the CPC reflects both bounded rationality and oversight risk. Unfamiliar projects are penalized because they require greater cognitive processing, while contested projects are penalized because they expose commissioners to greater political and reputational scrutiny. By contrast, routine and uncontested projects proceed with little resistance. These patterns highlight how the regulatory process itself shapes outcomes as a function of the trade-offs faced by commissioners.

6   Conclusion

This paper examined how cognitive and oversight constraints shape bureaucratic decision-making in the Los Angeles City Planning Commission. We developed a text-based measure of semantic uniqueness to capture the cognitive effort that unfamiliar proposals impose on commissioners, and used sentiment analysis of public correspondence to measure monitoring pressure. The results reveal that both constraints have significant effects on regulatory outcomes. Less familiar projects, which require greater interpretive effort, are less likely to receive full approval, while routine items proceed with little resistance. Public opposition exerts a similarly negative effect, whereas public support provides little offsetting influence. These patterns provide empirical evidence of bounded rationality in administrative decision-making, with bureaucrats allocating scarce attentional resources across proposals, prioritizing those that are familiar or safe under scrutiny. Institutional mechanisms such as the consent calendar function help economize on attention.

The results also have implications for urban development. Land-use regulation remains one of the central bottlenecks in housing supply, yet little is known about the role of the bureaucratic process vis-à-vis the statutory requirements. Our analysis shows that administrative capacity itself may constrain housing production beyond

the direct impact of statutory restrictions. Negative public pressure clearly shapes outcomes, but cognitive limits—and thus, bureaucratic capacity—also constrain approval of novel or complex projects. The result is a form of institutional lock-in. By favoring projects that are easiest to interpret and defend, the process may reinforce its own expectations, narrowing the range of designs it can evaluate, limiting innovation in development to meet the needs of residents.

More broadly, our framework demonstrates how text can be used to represent the decision architecture within organizations. With such data becoming increasingly available, semantic uniqueness provides a scalable measure to study how information is processed, attention is allocated, and discretion is transformed into routines. These mechanisms deepen our understanding of how organizations adapt, and the conditions under which they resist change.

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Figure 1: Example of an Agenda Item

6. **DIR-2019-6048-TOC-SPR-WDI-1A**
CEQA: ENV-2016-273-MND-REC1
Plan Area: Northeast Los Angeles

Council District: 1 – Cedillo
Last Day to Act: 10-08-20
Continued from: 08-13-20
08-27-20

PUBLIC HEARING REQUIRED

PROJECT SITE: 135 – 153 West Avenue 34; 3401 – 3437 North Pasadena Avenue

PROPOSED PROJECT:
Construction, use, and maintenance of a new, five-story, 514,756 square-foot mixed use building with 468 dwelling units, including 66 dwelling units set aside for Very Low Income Households (or 14 percent of the proposed density) and 16,395 square feet of commercial space. The development will be constructed within two phases, and is designed as one building which includes two levels of subterrean parking across the entire site with three structures above that include residential and commercial uses. The structures will be four and five stories tall with a total of 311 automobile parking spaces, 35 short-term and 264 long-term bicycle parking spaces, and a total of 49,152 square feet of open space for residents.

APPEAL:
An appeal of the June 12, 2020, Planning Director's Determination which:
1. Based on the independent judgment of the decision-maker, after consideration of the whole of the administrative record, the Project was assessed in Mitigated Negative Declaration, No. ENV-2016-273-MND adopted on August 22, 2017; and pursuant to CEQA Guidelines 15162 and 15164, as supported by the addendum dated December 2019, no major revisions are required to the Mitigated Declaration; and no subsequent EIR or negative declaration is required for approval of the Project;
2. Approved, pursuant to Section 12.22 A.31 of the Los Angeles Municipal Code (LAMC), a 70 percent increase in density bonus consistent with the provisions of the Transit Oriented Communities Affordable Housing Incentive Program for a Tier 3 project with a total of 468 dwelling units, including 66 dwelling units reserved for Very Low Income (VLI) Households occupancy for a period of 55 years, along with the following two Additional Incentives:
   a. Setback. To permit the use of any or all the yard requirements for the RAS3 Zone in lieu of the [T][Q]CM-2D Zone; and
   b. Transitional Height. To utilize the Transit Oriented Communities transitional height requirements in lieu of those found in LAMC Section 12.21.1 A.10;
3. Approved, pursuant to LAMC Section 12.37 I, a Waiver of Dedication and Improvement for a five-foot dedication and three-foot widening along Avenue 34 and a 15 feet by 15 feet chamfer or a 20 foot radius corner cut along northwest intersection of Avenue 34 and Pasadena Avenue, in order to maintain the existing condition along Avenue 34 and the corner of Avenue 34 and Pasadena Avenue;
4. Conditionally Approved, pursuant to LAMC Section 16.05, a Site Plan Review for the construction, use and maintenance of a new, five-story, mixed-use building with 468 dwelling units, and 16,395 square feet of commercial space in the [T][Q]CM-2D Zone; and
5. Adopted the Conditions of Approval and Findings.

Applicant: Jay Stark, R Cap Avenue 34, LLC
Representative: Andrew Brady, DLA Piper, LLP

Appellant: Patricia Camacho

Staff: Michelle Carter, City Planning Associate
michelle.carter@lacity.org
(213) 978-1262

Figure 2: Example of a Minutes Item

ITEM NO. 6

DIR-2019-6048-TOC-SPR-WDI-1A   Council District: 1 – Cedillo
CEQA: ENV-2016-273-MND-REC1   Last Day to Act: 10-08-20
Plan Area: Northeast Los Angeles   Continued from: 08-13-20
                                                           08-27-20

PUBLIC HEARING HELD

PROJECT SITE: 135 – 153 West Avenue 34; 3401 – 3437 North Pasadena Avenue

IN ATTENDANCE VIA ZOOM WEBINAR/TELECONFERENCE:
Michelle Carter, City Planning Associate, Oliver Netburn, City Planner and Nicholas Hendricks, Senior City Planner representing the Department; Jerry Newman and Andrew Brady, representing the Applicant; and Michael Hayden representing the Appellant and Patricia Camacho, Appellant.

At approximately 10:55 a.m. President Millman announced Commissioner Leung left the zoom webinar/teleconference meeting during Public Comment for this item.

MOTION:
Commissioner Ambroz put forth the actions below in conjunction with the approval of the following Project with modifications, if any, stated on the record:

Construction, use, and maintenance of a new, five-story, 514,756 square-foot mixed use building with 468 dwelling units, including 66 dwelling units set aside for Very Low Income Households (or 14 percent of the proposed density) and 16,395 square feet of commercial space. The development will be constructed within two phases, and is designed as one building which includes two levels of subterrean parking across the entire site with three structures above that include residential and commercial uses. The structures will be four and five stories tall with a total of 311 automobile parking spaces, 35 short-term and 264 long-term bicycle parking spaces, and a total of 49,152 square feet of open space for residents.

1. Find, based on the independent judgment of the decision-maker, after consideration of the whole of the administrative record, the Project was assessed in Mitigated Negative Declaration, No. ENV-2016-273-MND adopted on August 22, 2017; and pursuant to CEQA Guidelines   15162   and 15164, as supported by the addendum dated December 2019, no major revisions are required to the Mitigated Declaration; and no subsequent EIR or negative declaration is required for approval of the Project;
2. Deny the appeal in part and grant the appeal in part of the Planning Director's decision dated June 12, 2020;
3. Approve, pursuant to Section 12.22 A.31 of the Los Angeles Municipal Code (LAMC), a 70 percent increase in density bonus consistent with the provisions of the Transit Oriented Communities Affordable Housing Incentive Program for a Tier 3 project with a total of 468 dwelling units, including 66 dwelling units reserved for Very Low Income (VLI) Households occupancy for a period of 55 years, along with the following two Additional Incentives:
   a. Setback. To permit the use of any or all the yard requirements for the RAS3 Zone in lieu of the [T][Q]CM-2D Zone; and
   b. Transitional Height. To utilize the Transit Oriented Communities transitional height requirements in lieu of those found in LAMC Section 12.21.1 A.10;
4. Approve, pursuant to LAMC Section 12.37 I, a Waiver of Dedication and Improvement for a five-foot dedication and three-foot widening along Avenue 34 and a 15 feet by 15 feet chamfer or a 20 foot radius corner cut along northwest intersection of Avenue 34 and Pasadena Avenue, in order to maintain the existing condition along Avenue 34 and the corner of Avenue 34 and Pasadena Avenue;
5. Conditionally Approve, pursuant to LAMC Section 16.05, a Site Plan Review for the construction, use and maintenance of a new, five-story, mixed-use building with 468 dwelling units, and 16,395 square feet of commercial space in the [T][Q]CM-2D Zone;
6. Adopt the Conditions of Approval, as modified by the Commission, including Staff's Technical Modification dated August 10, 2020 and October 7, 2020; and
7. Adopt the Findings.

Commissioner Perlman seconded the motion and the vote proceeded as follows:

Moved: Ambroz
Second: Perlman
Ayes: Khorsand, Millman, Mitchell
Nay: Mack
Absent: Choe, Leung

Vote: **5 – 1**

MOTION PASSED

Figure 3: Example of a Support Letter

DIR-2019-6048-TOC-SPR-WDI-1A

Armando Carvalho <acarvalhoplacer11@gmail.com>   Mon, Oct 5, 2020 at 7:18 PM
To: cpc@lacity.org, michelle.carter@lacity.org

Dear City Planning Commission and/or Ms. Michelle Carter,

My name is Armando Carvalho and I am a resident of Lincoln Heights, only a few blocks away from the proposed project on 135-153 West Avenue 34. Due to my job I am unable to attend the City Planning Commission hearing on October 8th in person, but I would like to make a brief comment in support of the project.

Los Angeles direly needs more housing, and this project demonstrates a solution that helps both low income and moderate income residents. I like how this project includes 66 low income units for families but also provides housing for middle income families since the rest of the units are set at market rate. I also like how close it is to the transit station and how there are fewer parking spots than units. I think we need more housing like this in Los Angeles in order to fight the car culture. Additionally, I love how there is specific bicycle parking for the new building. My only recommendation is that fewer parking spots are allotted so that owning a car would be more difficult - as that is the only way we are going to shift this toxic car culture in the city.

I know many of my neighbors are against this project, for reasons I cannot understand. One of the issues they raise is the pollution on site, but they fail to understand that by promoting a car free culture pollution is actually decreased. I also fail to understand their arguments about being residents being pushed out of the neighborhood. I would hold this project to a much higher standard if it were displacing people on the site but that is simply not the case. Lastly, there is concern about parking since this project will bring in more cars. I am a strong follower of the ideals of Donald Shoup, a professor in the Department of Urban Planning at UCLA. He argues, and I agree, that providing "free parking" is actually extremely expensive for society and ought to be done away with. With less parking available, it will force more people to abandon their cars and use the world class Metro system we have here in Los Angeles.

As a resident of the neighborhood I feel this would be a valuable addition to our community, promote a public transit orientated lifestyle, and help alleviate the housing shortage here in Los Angeles. I hope to see your support of this project on October 8th.

Armando Carvalho

Figure 4: Example of an Oppose Letter

135 Avenue 34 Proposed Project

Adriana Beltran <adrianabee05@gmail.com>   Sun, Oct 4, 2020 at 12:04 AM
To: cpc@lacity.org, gilbert.cedillo@lacity.org, gerald.gubatan@lacity.org

DIR-2019-6048-TOC-SPR-WDI-1A
**ENV-2016-273-MND-REC1**

Hello,

My name is Adriana. I am a resident of Lincoln Heights, and I am emailing today to express my disapproval regarding the proposed development project on Avenue 34 in the Lincoln Heights community.

As an active resident and High School student in the area, this project will affect me because it will drive up neighboring rents, displacing the people who live in the Lincoln Heights community. In addition, this project will create significant displacement. The developers will only include 14% Low-Income units, with 85% at high market rates that will not help the community's current lack of affordable housing. The median combined annual household income in Lincoln Heights is $39,000. This makes even the low-income apartments out of reach for many in our community.
Given my points above, I demand you listen to community feedback and halt this project before it can do any more damage to the community of Lincoln Heights.
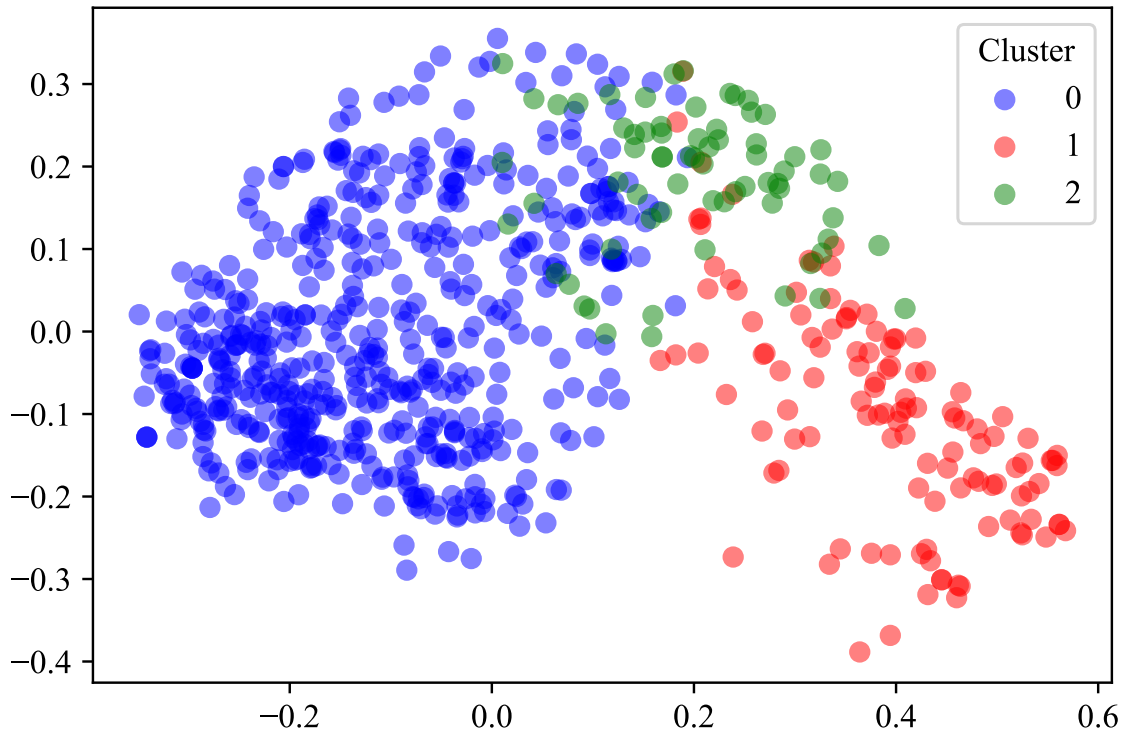
Sincerely,
Adriana B.

Figure 5: Scree Plot of PCA Components
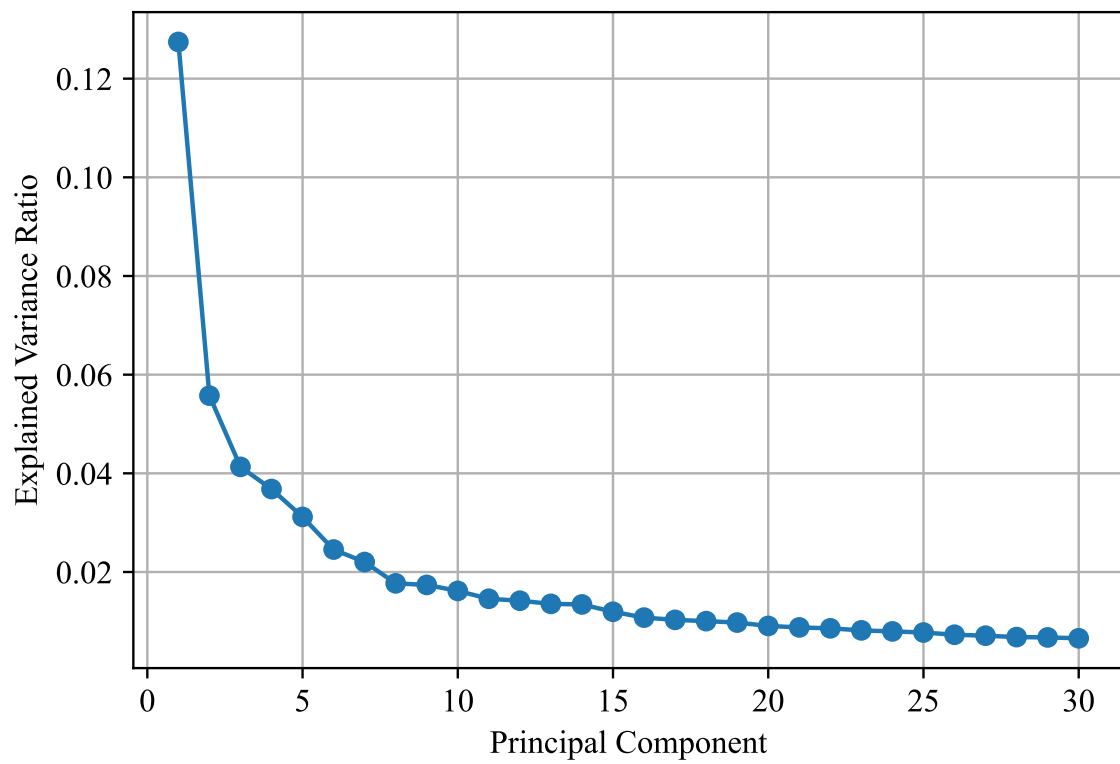
*Note*: Shows how much of the total variance in the 1,536 dimensional embedding space of the corpus of 727 agenda items is explained by each principal component.

Figure 6: PCA Reduced Embeddings with K-Means Clustering

Note: Result of K-means clustering with three clusters on the first 10 principal components of the embedding space. The first two dimensions of the 10-dimensional subspace are shown. Each dot is an agenda item.

Figure 7: Distribution of Number of Support and Opposition Letters
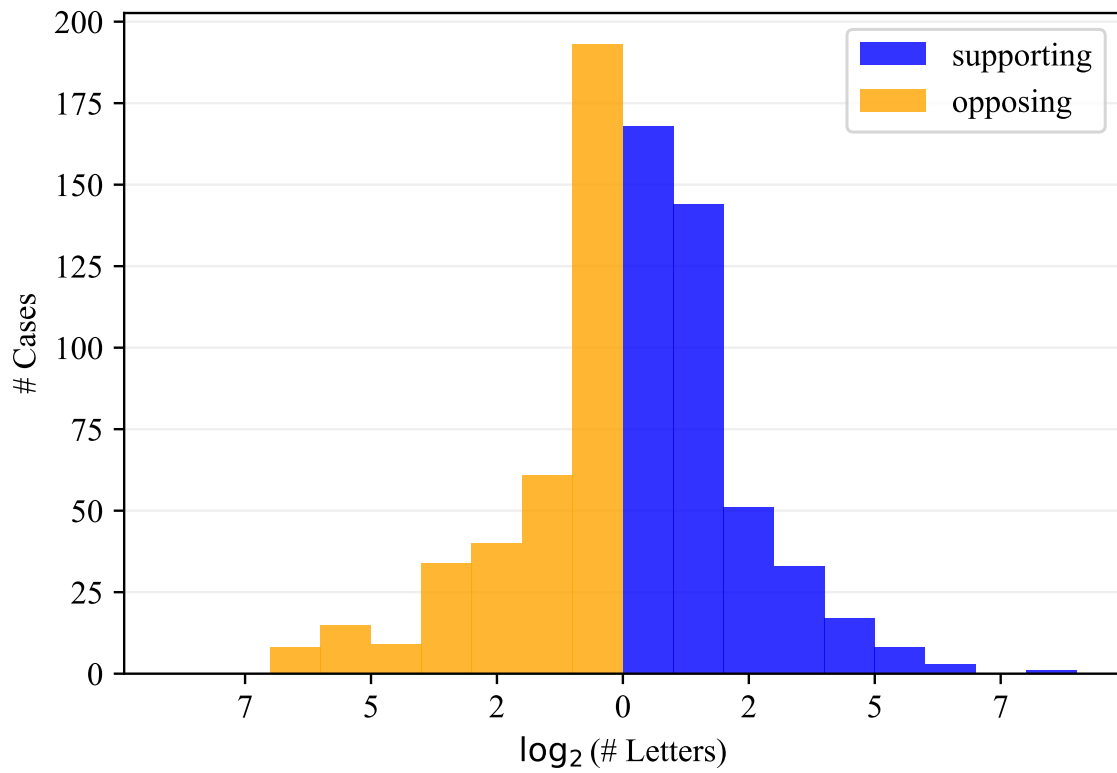
Note: Shows distribution of the number of supporting and opposing letters across cases. Cases with zero support or oppose letters are not included in the figure. Note that one case can have multiple supporting *and* opposing letters.

Table 1: Summary of Motion Outcomes and Vote Results

Project Implication	Unanimity				
	Unanimous	1 Nay	>1 Nays	Total	
Approved	365	23	4	392	(53.9%)
Approved in part or with conditions	183	17	16	216	(29.7%)
Deliberations continued to future date	108	4	0	112	(15.4%)
Denied	5	0	2	7	(1.0%)
TOTAL	661	44	22	727	
	(90.9%)	(6.1%)	(3.0%)		

Notes: This table shows the number of cases decided on by the City Planning Commission, organized by the implication of the motion for the project proposal and the unanimity of the vote.

Table 2: Ordered Logit Regression Results

	(1)	(2)	(3)	(4)
Semantic Uniqueness	-0.325***	-0.258***	-0.259***	-0.228**
	(0.080)	(0.083)	(0.088)	(0.105)
Agenda Perplexity		-4.649	-3.548	-3.861
		(3.209)	(3.197)	(3.250)
Agenda Order		0.095*	0.086*	0.042
		(0.050)	(0.050)	(0.053)
No. Agenda Items		-0.053	-0.041	-0.013
		(0.044)	(0.044)	(0.046)
Consent Calendar		1.456***	1.357***	1.423***
		(0.279)	(0.292)	(0.304)
$\log_2(\text{\# Support})$		0.038	0.049	0.051
		(0.055)	(0.058)	(0.057)
$\log_2(\text{\# Oppose})$		-0.169***	-0.195***	-0.209***
		(0.054)	(0.058)	(0.059)
Semantic Cluster FE	N	Y	Y	Y
Council District FE	N	N	Y	Y
Suffix Group FE	N	N	N	Y
μ_0	-2.641***	-7.425**	-6.324*	-6.248*
	(0.271)	(3.516)	(3.520)	(3.563)
μ_1	-1.136***	-5.844*	-4.696	-4.556
	(0.253)	(3.504)	(3.505)	(3.549)
No. of Obs	727	727	727	727
Pseudo R2	0.013	0.049	0.068	0.090

Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Notes: This table reports coefficient estimates from the ordered logit regression described in Section 4.

Table 3: Ordered Logit Marginal Effects

	(1)	(2)	(3)
	Outcome 2	Outcome 1	Outcome 0
Semantic Uniqueness	-0.048**	0.020**	0.028**
	(0.022)	(0.009)	(0.013)
Agenda Perplexity	-0.819	0.345	0.474
	(0.687)	(0.294)	(0.396)
Agenda Order	0.009	-0.004	-0.005
	(0.011)	(0.005)	(0.006)
No. Agenda Items	-0.003	0.001	0.002
	(0.010)	(0.004)	(0.006)
Consent Calendar	0.302***	-0.127***	-0.175***
	(0.062)	(0.026)	(0.039)
$\log_2(\text{\# Support})$	0.011	-0.005	-0.006
	(0.012)	(0.005)	(0.007)
$\log_2(\text{\# Oppose})$	-0.044***	0.019***	0.026***
	(0.012)	(0.005)	(0.007)
Semantic Cluster FE	Y	Y	Y
Council District FE	Y	Y	Y
Suffix Group FE	Y	Y	Y
No. of Obs	727	727	727

Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Notes: This table reports estimated marginal effects from the ordered logit regression in column (4) of Table 2.

A   Data Appendix

A.1   Data Extraction with LLMs

Extracting data from the raw PDFs downloaded from the Planning Department website is a multi-step process. First, individual agenda items need to be extracted from the raw agenda PDF. This is difficult using traditional NLP methods because the boundaries between agenda items in the PDF are not always consistently demarcated. However, LLMs are quite suited to this task of identifying the unique agenda items out of a single PDF containing the agenda.

The first step, therefore, is to extract the individual agenda items. Figure A1 shows the prompt we used to have the LLM read the agenda, then extract each individual agenda item. We ask the LLM to return the agenda's item number, its title (which is a Planning Department case number for any items requiring a decision), and a short summary of the agenda item.

After the agenda items are extracted, the next step is to extract data about each agenda item, using the agenda text. The raw agenda PDF is split into its individual components based on the extracted item number and title for each agenda item. The text for each individual agenda item is then fed into the prompt shown in Figure A2. The outputted response is then processed to extract the data features listed in Section 3.

After extracting data from the agenda text, we extract information about the deliberations over each agenda item from the minutes text. We first split the minutes PDF into the components relevant to each individual item, using the item number and title. We then take the agenda text for that item and the minutes text for that item and feed it into the prompt shown in Figure A3. The response from the LLM is then processed to extract the data features.

Lastly, we need to extract data from the supplemental documents. This step is challenging because all of the supplemental documents are spliced together into a single PDF, and we need to split the PDF into individual documents. While this would be relatively easy for a human to do, we found that LLMs were not able to accomplish this task reliably. We found that LLMs struggled to process longer PDFs, and it also had a hard time recognizing document boundaries when, for example, the document contains a large number of attachments, or when the document contains a page dedicated entirely to signatures. We therefore had to manually annotate the document boundaries in each of the PDFs containing supplemental documents.

After manually splitting the individual documents out of the supplemental document PDFs, we fed the document text into the prompt shown in Figure A4, along with the full text of the agenda for the associated meeting. It is necessary to include the full agenda in order to identify which agenda items the document is in reference to. We then process the LLM output to extract the relevant data features.

Figure A1: Prompt to Split and Summarize Agenda

```
  The following extracted PDF text contains the agenda for a LA City Planning
Commission meeting.


For each agenda item, return a summary in the following format:


ITEM NO: <agenda item number>
TITLE: <title of agenda item>
SUMMARY: <short summary of agenda item>


Separate each response by "---"


AGENDA:


«agenda text»
```

Figure A2: Prompt to Extract Agenda Item Data

```
  -- AGENDA ITEM --

«agenda item text»

-- PROMPT --

The document above is an agenda item from a Los Angeles City Planning Commission
(CPC) meeting.

Please return a response in the following format:

-- YOUR RESPONSE FORMAT --
RELATED CASES:
<A comma separated list of relevant planning department case numbers>

COUNCIL DISTRICT:
<What council district is the project located in?  Your only options are:  1, 2,
3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, CITYWIDE>

COUNCIL MEMBER:
<Who is the council member representing that district?  If district is CITYWIDE,
say N/A>

LAST DAY TO ACT:
<What is the last day to act?  Format your answer as YYYY-MM-DD>

SUMMARY OF PROJECT:
<Summarize the project and the requested actions.>

RELEVANT LAWS:
<List any referenced legal codes, ordinances, or programs that apply to the
requested actions>

APPEALED:
<Was there an appeal against an earlier determination?  Say YES or NO>

SUMMARY OF APPEAL:
<Summarize the appeal if there was one.  If no appeal, say N/A>

DISPUTED LAWS:
<List the referenced legal codes, ordinances, or programs which are in dispute
based on the appeal.  If no appeal, say N/A>
```

Figure A3: Prompt to Extract Data from Minutes

```
 -- AGENDA ITEM --

«agenda item text»

-- MINUTES OF DISCUSSION --

«minutes text for item»

-- PROMPT --

I just gave you two documents related to a Los Angeles City Planning Commission
(CPC) hearing.

The first document is the agenda item to be discussed, with requested actions.

The second document is the minutes of the discussion, the proposed motion by the
CPC, the votes on the motion by the CPC members, and whether the motion ultimately
passed.

Please return a response in the following format:

-- YOUR RESPONSE FORMAT --
RELATED CASES:
<A comma separated list of relevant planning department case numbers>

SUMMARY OF AGENDA ITEM:
<A summary of the agenda item to be discussed>

SUMMARY OF CPC DELIBERATIONS:
<A summary of the deliberations of the CPC.>

SUMMARY OF CPC MOTION:
<A summary of the motion voted on by the CPC>

MOVED:
<Which commission member moved the motion?  If multiple motions were made, use
only the last motion.  If no motion was made, say "N/A".>

SECONDED:
<Which commission member seconded the motion?  If multiple motions were made, use
only the last motion.  If no motion was made, say "N/A".>
```

```
 AYES:
<A comma separated list of commission members who voted for the motion.  If
multiple motions were made, use only the last motion.  If no one voted for, say
"NONE".  If no motion was made, say "N/A".>


NAYS:
<A comma separated list of commission members who voted against the motion.  If
multiple motions were made, use only the last motion.  If no one voted against,
say "NONE".  If no motion was made, say "N/A".>


ABSTAINED:
<A comma separated list of commission members who abstained from voting on the
motion.  If multiple motions were made, use only the last motion.  If no one
abstained, say "NONE".  If no motion was made, say "N/A".>


RECUSED:
<A comma separated list of commission members who were recused from voting on the
motion.  If multiple motions were made, use only the last motion.  If no one was
recused, say "NONE".  If no motion was made, say "N/A".>


ABSENT:
<A comma separated list of commission members who were absent.  If multiple
motions were made, use only the last motion.  If no one was absent, say "NONE".
If no motion was made, say "N/A".>


VOTE RESULT:
<Did the motion pass or fail?  Your only options are MOTION PASSED, MOTION FAILED,
N/A>


RESULT OF APPEAL:
<If the agenda item involved an appeal, say whether the appeal was granted or
denied.  Your only options are:  APPEAL GRANTED, APPEAL GRANTED IN PART, APPEAL
DENIED, NO APPEAL, DELIBERATIONS CONTINUED TO FUTURE DATE, APPLICATION WITHDRAWN>


IMPLICATION FOR PROJECT:
<What is the implication of the vote for the original requested actions?  Your
only options are:  APPROVED, APPROVED IN PART OR WITH MODIFICATIONS, DENIED,
DELIBERATIONS CONTINUED TO FUTURE DATE, APPLICATION WITHDRAWN>
```

Figure A4: Prompt to Extract Data from Supplemental Documents

```
  ==== LIST OF AGENDA ITEMS ====


«full agenda text»


==== DOCUMENT ====


«document text»


==== PROMPT ====


I just gave you a list of agenda items from a LA City Planning Commission meeting,
followed by a document submitted to that meeting.


Return a response in the following format:



==== YOUR RESPONSE FORMAT ====


TYPE OF DOCUMENT:
<What type of document is it?  Your only options are:  LETTER OR PETITION,
TECHNICAL MODIFICATION OR PROCEDURAL MATTER, SCIENTIFIC OR TECHNICAL REPORT, CV
OR BIOGRAPHY, CORRUPTED/ILLEGIBLE/BLANK, TITLE OR SECTION HEADING, OTHER.>


TYPE OF AUTHOR:
<What type of entity wrote the document?  Your only options are:  INDIVIDUAL,
ADVOCACY GROUP, CONSULTANT, LAWYER, DEVELOPER, PUBLIC OFFICIAL, OTHER.>


SUMMARY OF DOCUMENT:
<Summarize the contents of the document.>


REFERENCED AGENDA ITEMS:
<List the agenda items, as a comma delimited list of item numbers, that the
submitted document references or is relevant to.  If none, say NONE.>


SUPPORT OR OPPOSE:
<Does the submitted document support or oppose the referenced agenda items?  Your
only options are:  DEFINITELY SUPPORT, SOMEWHAT SUPPORT, DEFINITELY OPPOSE,
SOMEWHAT OPPOSE, NEUTRAL, NOT RELEVANT.>
```