ARTICLE TEMPLATE

"How has the Brazilian Amazon been constructed as a problem? An analysis of presidential speeches since 1985"

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ABSTRACT
This paper. . .

1. 1 Introduction

The Amazon needs to be protected from foreign interests. The Amazon needs to be exploited for its natural resources. The Amazon needs to be preserved as a standing ecosystem. Historically, different Brazilian federal government proposed diverse policies to deal with the Amazon. Each of these policies contain an implicit assumption of what needs to be solved, or in other words, it represents the region, the forest, or its peoples as a particular problem. In the three examples above, the Amazon is represented as an issue of national sovereignty, economic integration, and environmental conservation, respectively. Each of these constructions, and their proposed solutions, have been described as policy cycles of Brazilian governments (**???**). However, policy cycles are usually represented monolithically, advancing a view that specific governments see the Amazon as an instance of only one specific problem. Albeit the current calls to understand the environment as a social-cultural construction and to identify the effect of culture on environmental outcomes (**?**), we lack empirical accounts of how the Brazilian Amazon has been constructed as a problem over time, by geographical location, and between and within governments

In this article, we investigate how the Brazilian Amazon has been constructed as a problem in political discourses. Building on **?** concept of chosen problems in policy making, we propose a framework to identify how problem-construction. Although problem-construction takes place in a series of instances (e.g. policy committees, legislative bodies, media, etc.), we analyze the case of political discourse by Brazilian presidents since 1985. We opt for presidential speeches for three reasons. First, political discourses at the top have the power to introduce and justify public policy, as well as shape its perception to broad audiences (**?**). In turn, policy perception is key for

policy adoption and implementation (**??**). The literature has shown that deforestation rates in Brazil are more responsive to the government's environmental policy than exogenous factors as market fluctuations (**???**). Thus, understanding how policy comes about discursively is important. Second, environmental discourse at the top can help expand or restrict what types of behaviors are accepted in the ground. When Brazilian presidents speak about the Amazon it not only makes headlines, nationally and internationally(**???**), but also incites responses, shapes expectations, and feeds into the behavior of many actors involved in the Amazon, from investors to agribusiness to local farmer. This is especially pertinent for deforestation as previous research found that policy expectations, generated from material and discursive governmental practices, are a crucial factor in decisions to deforest at the ground (**??**). Unpacking discourse at the top might help us raise hypotheses about environmental outcomes that are culturally situated. Finally, as our theoretical framework suggests, problem-construction varies by geographic location. Presidential discourses take place in a series of sites with diverse audiences: from launching a new bridge in a small municipality in the middle of the Amazon, to a keynote speech in a business association in São Paulo, to the UN general assembly in New York. Working with presidential discourses allows us to identify this variation in meaningful ways and better how the Amazon is socially constructed.

To investigate how the Brazilian Amazon has been constructed as a problem in political discourses, we create a dataset containing 6130 official presidential speeches by all Brazilian presidents since 1985. We subset the dataset by identifying Amazonian related statements within these speeches. We find that 2014 sections in these discourses refer to the Amazon at least once. We then develop a codebook grounded on Amazonian historiography to code how each of these statements constructs the Amazon as a particular problem. We use this codebook to manually code a randomly selected training set of the Amazonian related statements. Using R, we then train a supervised machine-learning model in the hand-coded set and automatically label the remaining set of Amazonian statements. We then conduct a descriptive and inferential analysis of this data, tying our findings to endogenous and exogenous events related to deforestation.

Our findings are threefold. First, endogenous events as the death of Chico Mendes, the 1992 Earth Summit, the 2009 Copenhaguen Summit, the 2015 Paris Summit, and the 2021 London Summit drive generally the interest in the Amazon. That seems to be the case even after controlling share of annual speeches mentioning the Amazon for deforestation, inflation, and speaker. Second, there was a sharp decrease in economic related problem-constructions from the late 1990 to 2010, matched by an increase in speeches that construct the Amazon as a problem of social development and environmental conservation. This trend is reversed in the late 2010s, with the twist of sovereignty making a strong comeback. Finally, using a multinominal model, we find that the farthest away the speaker is from the Amazon, be it within the country in non-Amazonian States or outside Brazil, the more likely the speaker is to construct the Amazon as a problem of environmental conservation than economic integration or social development.

This article proceeds as follows: first, we review Amazonian literature to identify the main policy-cycles and their underlying problem construction. We then propose a theoretical framework to understand problem-construction and discourse. In the methodology section, we operationalize our framework and present the codebook. Section four portrays our main results. Finally, we conclude by discussing our findings and proposing future research.

2. 2 Amazonian policy-cycles, discourse, and problem-construction

2.1. *2.1 Literature Review: policy-cycles in the Amazonian literature*

For the purposes of this article, we understand Amazonian literature as the body of research by social and environmental scientists that tells the story of diverse policies adopted to solve problems in the region. The three main policy-cycles we identify in Amazonian literature are: national sovereignty, economic integration, and environmental conservation. We tie each one of them to a specific problem and consequently a solution. We close the sub-section reviewing the relationship between policy, presidential discourse, and environmental problems.

2.1.1. *2.1.1 National sovereignty*

In The Fate of the Forest: Developers, Destroyers, and Defenders of the Amazon, Hecht and Cockburn write that all over the world tropical forests are destroyed, but "what imbues the case of the Amazon with such passion is the symbolic content of the dreams it ignites" (**?**, pp.1). It started with the first natural history of the New World, by Oviedo in 1535, who recounts the stories of conquest of local populations and gold hoarders. The dream of fortunes to be found in the Eldorado composed the imaginaries of *bandeirantes*[1] from the southeast of Brazil and colonizers from everywhere else. It rendered the territory the venue for aspiration and object of an intense scramble in the subsequent centuries, defined as "a (. . .) form of nation building (. . .)" (Hecht and Cockburn 1990, preface). The Portuguese empire and subsequently the Brazilian monarchy were concerned with establishing their territory. In the process of securing Amazonian borders, Brazil thwarted "the imperial ambitions of France, Britain, the United States, Belgium, Bolivia, and Peru" (**?**, pp.8), and when the dust settled and the scramble was over, half of the Amazon emerged Brazilian. While Brazilian military diplomacy was very successful, the process did not come without its traumas. A significant experience were the negotiations with Bolivia in 1902 to secure the Amazonian state of Acre, during which they found out about American attempts to trick Brazil(**?**). This case was still part of the memory of the generals who led the country during the military dictatorship of 1964 and wanted to protect Brazil's sovereignty over the Amazon from the communist threat during the Cold War(**?**).

As we move from a world where non-state actors gain importance in environmental governance and international politics generally (**???**), the sovereignty problem becomes more varied. Multiple non-state actors (NGOs, foundations, IOs, and so on) join the conversation about Amazonian policies more substantially as the military dictatorship starts to end (**???**). Threads to national sovereignty, consequently, can be interpreted as coming from a different set of actors than before. Allegedly false claims about the Brazilian Amazon in international and domestic fora, for instance, are often tied to strategies of 'internationalizing' the Amazon. This might come both from foreign actors as well as domestic non-state actors. Relatedly, mentions of Amazonian myths which have been debunked as the 'Earth of the Lungs', are also tied to internationalizing strategies.

The sovereignty problem advances the view that the Brazilian Amazon is Brazilian and foreign presence, non-state presence and alleged lies are part of a broader

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[1] *Bandeirantes* means "flag-carriers", the word is used to designate Portuguese colonials and later Brazilian explorers, expanding the Brazilian territory beyond what the Tordesillas Treaty established. The treaty allocated almost the whole Amazonian territory to the Spanish Empire, the bandeirantes took much of the territory afterwards.

strategy to internationalize the region. The policy solutions relate to close monitoring of the borders, strict regimes related to entry in the region, and combating alleged disinformation about the Amazon nationally and internationally.

2.1.2. 2.1.2 Economic integration

The Vargas dictatorship (1937-46) and the military dictatorship (1964-89) took over the task of modernizing the Amazon. In 1966, the Brazilian Military launched Operation Amazon, a policy to modernize the region based on a set of assumptions (**?**). First, nature should be conquered by men. Second, exploiting natural resources would render the Amazon region a global powerhouse. Third, such a project would integrate the region with the rest of the country. Concretely, this meant a series of infrastructure projects, such as roads and dams, incentives for settlers to develop ranches and expand the agricultural frontier, as well as establishing tax free zones to attract industry. The capital to conduct such changes, paradoxically, came from national and international sources (**?**), leading to a series of national and international enterprises settling in the Amazon region. **?** describes the period from the 1950-80 in a similar fashion, referring to a wider range of policies of economic integration: the 1953 Plano de Valorização Econômica da Amazônia; the 1966 Superintendência do Desenvolvimento da Amazônia; the 1967 Superintendência da Zona Franca de Manaus; the 1970 Plano de Integração Nacional; the 1975 Programa Polamazônia; the 1980s Programa Grande Carajás and Programa Calha Norte; among others.

The economic integration problem advances the view that the Brazilian Amazon needs to be developed and modernized. The policy solution relates to the creation of a series of policies, often centralized by the federal government and thus external to the region (**?**), that have at its core the development of the necessary infrastructure (physical, fiscal, or monetary) to integrate the region in the national and international economy.

2.1.3. 2.1.3 Environmental conservation

The rapid economic changes in the region in the 1960s, 1970s, and 1980s were matched with the birth of environmental institutions such as the New Forest Code (1964), the Secretary of Environment (1973), and the National Environment Law (1980) (**?**). A common explanation for these institutions in the Amazonian literature is the impression of lack of control after years of centalized economic integration policies (**???**). As deforestation, fires, and violence rose in the region, catching international attention, the military government deemed as necessary the establishment of an environmental bureaucracy. This process accelerated in the late 1980s, with the birth of modern environmentalism epitomized in the 1992 Earth Summit in Rio de Janeiro (**??**). **?** argue that during preparations for the summit, a new form of Brazilian environmentalism emerged: socio-environmentalism. They define it as an emphasis on local livelihoods of people while protecting nature. **?** argues in a similar line, establishing socio-environmentalism as the main government response in the 1990s and early 2000s in a series of policies: the 2001 Sistema Nacional de Unidades de Conservação; the 2003 Programa Amanônia Sustentavel; the 2004 Plano de Ação para a Prevenção e Controle do Desmatamento na Amazônia Legal; the 2004 Plano BR-163 Sustentável; the 2010 Lei Nacional das Mudanças Climáticas; among others.

The conservationist problem-construction advances the view that Amazon should be preserved, deforestation should be halted, and the sustainable practices of indige-

nous and local peoples should be maintained through protection of their territories and rights to self-determination (**?**). The policy solution implies more investment in command-and-control infrastructure (as remote-sensing technology for environmental outcome measurement), more investment in the valuation of standing ecosystems through incentive schemes, and more policies facilitating indigenous environmental practices.

2.1.4. *2.1.4 Policy and discourse*

Different authors have proposed similar periodization for policy-cycles in the Amazon: a focus on sovereignty until the military dictatorship of 1964, followed by strong economic integration policies until the mid 1980s, and finally a shift to conservation after the 1992 Earth Summit. At the macro-historical level, the wider Amazonian vision of the 1964 military dictatorship, encompassed by the whole group of policies they adopted, for instance, did favor economic integration. Nevertheless, at the level of policies adopted, there is more variation than these periods would suggest. For example, the 1980 Programa Calha Norte did contain elements to ensure sovereignty, integrate the region to the country's economy, and preserve the forest. Framing this policy as an issue of economic integration, then, can be seen as a choice.

Hence, while the literature might represent governments as coherent proponents of a particular policy retroactively, political actors might have adopted strategies that outline problem-constructions of policies differently. For historical inquiry, it is important to periodize policy cycles comprehensively. We largely agree with what the literature assigns to previous governments. However, the possibility of varied portrayals of the same policy opens up an understanding agenda-setting and policy-adoption that is less linear.

Problem-construction at the level of discourse is also more varied. They are not monolithic in time, across location, or even by the same speaker. While governmental discourses in Brazil have been studied for topic such as inflation or race relations[2], we only find one systematic analysis of Amazonian discourse. **?** investigates Amazonian discourse in the Brazilian Congress with the objective of identifying the arguments put forth by congressmen. The main finding is that the economic value of the Amazon for the cattle industry is the most salient narrative, leading the author to conclude there is a mismatch between the international debate (which focuses on preservation) and the national debate (which focuses on economic development).

We also find several analyzes of environmental discourse in American presidential speeches. **?** examines 2919 mentions of climate change in American official presidential speeches since 1989. Among various findings, one that stands out is that American presidents frequently side-step the environmental aspects of climate change (ibid). He also identifies a shift from economic to security framing of climate issues, side-lining its environmental aspects. In another article, **?** tests the effect of geographic location and type of communication regarding climate change. Building prominently on **?** but also others, he hypothesizes that presidents are more likely to mention climate change in foreign locations, and that location influences the specific discursive approach and tone they adopt. He finds evidence in support of his hypothesis, suggesting American presidential discourse at the top on climate change does change based on location. Another example is **?**, who investigates how the 'environment' has been constructed in

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[2]For an overview on how inflation and political discourse in Brazil see Porto (2007), Malheiros-Poulet (2012), and Fonseca et al. (2021). For a few studies on racist and anti-racist discourses in Brazil see Htun (2004), Silva and Larkins (2019) and Dijk (2020).

American presidential discourse since 1960 using a more automated approach. The author finds that mentions of the environment are typically co-selected with the pronoun 'our', as well as with 'economy', 'clean', and 'preserve'.

While these findings hold for the US, they suffice to argue that presidents can raise different points about the Amazon at local, national, or international settings, depending on who they assume their audience is at that specific instance. That entails the same president can combine, substitute, or change how they talk about the Amazon and these views can reflect, or not, the current political scenario, issues in the agenda, or talk to a different policy cycle at times.

2.2.   *2.2 Theoretical framework: problem-construction and presidential discourse*

In "Journey towards Progress", Hirschman (1963) analyzes three policy problems in three different Latin American countries. The author draws a conceptual distinction between pressing problems (pressured from outside parties to the government) and chosen problems (chosen by the government at their own discretion). Pressing problems can be either privileged or neglected depending on the degree of pressure exercised by the interested group. Problems can change from pressing to chosen across time and in space as a function of solutions becoming available, changing level of government control in society, or top policymakers shifting interests (**?**, pp.388-91). Choosing a problem, though, entails a decision on how to represent it (**?**). As Bacchi puts "policy has a cultural dimension. It takes shape within specific historical and national or international contexts" (**?**, pp.10). The existence or proposal of a policy generally implies that there is a (public) problem that needs (governmental) action to be fixed. The alleged problem is not always explicitly stated in policy. Hirschman exemplifies chosen problems with the case of the construction of Brasilia (**?**, pp.388). But building Brasilia can solve a problem of regional inequality, a problem of a dormant economy without state investment, a problem of political representation, or all three. How to represent a policy is a matter of choice. And different representations speak to different audiences.

We understand that depending on how the problem is represented to be, it can be a solution of problems that are considered pressing. Different problem-constructions can address the demands of different constituencies and it is up to the discretion of the political actor to construct a particular problem in a particular way given context. Problem-construction takes place in different sites: national media, legislative bodies, international fora, policy committees, among others. What eventually becomes policy is a product of a multi-faceted process in all these different sites. One avenue through which governments can emphasize the representations of a problem is discourse. We assume that problem-construction at the level of discourse is varied. They are not monolithic in time, across location, or even by the same speaker.

We argue that presidents can employ specific problem-constructions that build objects as specific problems depending on the context. In the specific case of the Brazilian Amazon, we contend that Amazonian problem-construction connect the region to issues of sovereignty, economic integration, social development, or environmental conservation. Presidents choose to represent the region as a particular problem. As Bacchi (2009), we argue that problem-constructions touch on shared meanings about the region that are available to the speaker as part of larger social-cultural history. Thus, the ways a president speaks are culturally and historically mediated and need

to be embedded in the wider history of the region and country. We consider this an advancement in relation to scholars looking at American presidential speeches, as they just count mentions to climate change (**???**) or environment (**?**) without embedding them in the histories of the issue in the country.

These are the cornerstones of our framework: while governments are sometimes portrayed as proponents of a specific policy-solution, the way they construct the Amazon as a problem varies. The specific problem-constructions that we propose are embedded in Amazonian historiography and connect presidential speeches to Brazilian larger social-cultural history. We propose a framework to understand variation in problem-construction as a choice that is responsive to geographic location, time, and speaker.

3.   3 Research Design

To operationalize our theoretical framework, we adopt a mixed-methods approach using manual coding and supervised machine learning. We explain our research design and each step of the procedure in this section.

3.1.   *3.1 Data and modeling: operationalizing Amazonian problem construction*

We build upon the dataset provided by (**?**) which contains all official speeches by Brazilian Presidents from 1985 to 2019 scrapped from the archives of the Brazilian Presidential Library. We update the dataset by scraping and adding all official speeches from 2020 and 2021. The final dataset encompasses 6130 speeches for all the presidents of Brazil since 1985. We then identify all speeches about the Amazon as a region, peoples, or forest out of the 6130 speeches. We do so by detecting all speeches in which the stem "amazon" appears. In Portuguese, the stem captures terms such as "Amazonia", "Amazonica", "Amazonidas", "Amazonense(s)", "Amazonas", among others. We find that 946 speeches are, at least partially, about the Amazon from the 6130.

Using the poldis R package, we proceed to extract two sentences before and two sentences after the sentence in which the stem "amazon" appears. We opt for picking two sentences before and two sentences after, rather than words, because sentences usually contain a cohesive idea. By doing so we create our unit of analysis: an Amazonian statement. We use Amazon statements as our unit of analysis for two main reasons. First, working at the level of statements allows us to identify only passages that are meaningful for our specific purpose. Second, it increases the number of our observations and its variety meaningfully, allowing for more specificity in our analysis. This process yields 2014 unique Amazonian statements across the 946 speeches about the Amazon identified. When an Amazonian statement contains two or more matches of the stem "amazon", we get two sentences before the first match and two sentences after the last match. On average, an Amazonian statement contains 123 words.

After revising the literature (section 2), we selected a random sample of these Amazonian statements to develop a codebook for identifying how the Amazon is constructed as a problem in presidential discourse (see Table 1 below). We understand Amazonian problem-constructions as Weberian ideal types, that is, an unified analytical construct portraying a 'pure' version of a phenomenon. This serves the purpose of allocating empirical observations within a range of possibilities. We identify the three problem-constructions derived from the literature (national sovereignty, economic in-

tegration, and environmental conservation) in the sample of Amazonian statements. However, in addition to them, we inductively identified a fourth problem construction that the literature does not explicitly cover: social development. Presidents sometimes opt to emphasize the lack of hospitals, sanitation, and schools in relation to peoples' constitutional rights when speaking about the Amazon. We saw this code category as substantially different from the other three, hence, we created the code category 'social development'. In their conceptualization, each code is mutually exclusive in its conceptualization, meaning that they cover different forms of constructing the Amazon as a problem, though each Amazonian statement might be assigned to one or more codes. A statement can, for example, construct the Amazon as a problem of sovereignty and a problem of economic integration or a problem of social development and conservation. Amazonian statements, thus, can be either coded as a pure-types or mixed-types.

Problem_Construction	Description
National Sovereignty	This code constructs the Amazon region and/or forest as an issue of natio
Economic Integration	This code constructs the Amazon region and/or forest as an issue of econo
Social Development	This code constructs the Amazon region and/or forest as an issue of socia
Environmental Conservation	This code constructs the Amazon region and/or forest as an issue of conse

With the codebook in hands, each one of the authors, separately, hand-coded the same set of 1007 randomly selected Amazonian statements. This amount refers to 50% of all the Amazon Statements identified. Inter-coder agreement for each of the four main categories was 85%, on average. For each non-matching coded observation, the co-authors discussed and sorted their disagreements. Statements that mention the stem "amazon", but are not about the Brazilian Amazon, for example, might a greeting to the Governor of the Amazonas, were coded as false positives. The manually coded data is then randomly divided into a training set, containing 80% of the hand-coded observations (806 observations), and a validation set, containing the remaining 20% of the hand-coded data (201 observations). The training set is used to train the supervised machine-learning model that automatically classifies observations while the validation set is used to make sure the model fit is appropriate.

We chose to employ a support-vector machine (SVM) algorithm to label texts, that is, a non-probabilistic linear classifier that classifies documents by assigning points in mapped space to maximize the gap between binary categories (**??**)[3]. After the SVM model is trained and tuned, and the model shows to appropriately fit the validation set, we use the model to automatically code the remaining 1007 Amazonian statements. The model was also trained to identify false positive observations, which we chose to delete for analysis since these are not meaningful statements about the Amazon. The final dataset for analysis contains 1895 coded Amazonian statements. Finally, we use poldis once more to extract locations for all speeches in the data. These locations represent the Brazilian state in which certain speech was given or an international country.

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[3]For more information on this please see the extended methodology. The document includes a detailed discussion of how the SVM algorithm was chosen over other algorithms based on evaluation of performance of trained models for labeling the validation set. The extended methodology also includes a more detailed codebook table with further coding guidelines.

3.2. *3.2 Analysis and limitations*

To analyze our data, we first present a series of different plots on proportions of Amazonian statements and problem-constructions over time and by presidents. We control proportions for factors that might affect the incidence of the Amazon in speeches and portray both real and controlled curves. To test whether different problem constructions change according to location, we run a multinomial regression model in which different problem constructions (as categories) are the dependent variable and location is the independent variable. We code 4 different location categories for where speeches take place, they are: Amazonian states, non-Amazonian states, Brasilia, and International. In the model, we also control for annual deforestation rates, annual inflation rates, and election years in the model as these are variables which could mitigate the correlations between problem construction and location[4]. We interpret the plots and model considering multiple Amazon related events and policies over the last 30 years, as well as their correlations with different presidents and locations, while embedding problem-construction in contemporary happenings.

These procedures come with its limitations. Our codebook is developed using specific Amazon related vocabulary. For example, a statement will be coded as economic integration if it is a meaningful support to the Zona Franca of Manaus or a Dam in the Amazon. However, the economy is generally a topic that presidents speak about. Hence, high incidence of economic integration in Amazonian statements can also be related to the higher importance of this problem-construction in Brazil in time. Moreover, we classify statements as Amazonian based on a dictionary composed of a single lexicon stem: "amazon". We chose to do so knowing that a few speeches about the Amazon might not contain the lexicon "Amazon", for example, when the president says, "the forest" or "deforestation". Hence, we might be missing statements about Amazon that do not refer to it. However, we consider this safer as we cannot be sure that mentions of the forest or deforestation do not correspond to other biomes such as the Cerrado or the Mata Atlantica. Nevertheless, our dataset covers only what is considered an official remark. Presidents, though, give interviews, appear in debates, talk at campaign rallies, and more recently start to appear in social media. Problem-construction within presidential discourse, thus, also happens in different sites for which we do not account for in this paper.

4. 4 How has the amazon been constructed as a problem?

This section presents the three main findings of our analysis. We open with a broad overview of the evolution of the incidence of Amazon in all presidential speeches since 1985. In section 4.2, we focus on speeches that mention the Amazon, introducing the specific problem-constructions we presented in section 2.1. Finally, we run a multinomial model to show how problem constructions change as the speaker moves further away from the Amazon region.

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[4]See extended methodology for more information on model selection, controls and post estimation tests.

4.1. *4.1 The rises and falls of the Amazon as a topic in presidential speeches*

Figure 1 shows the proportion of speeches that mentions the Amazon in relation to all speeches in each year. The predicted share curve controls incidence for deforestation[5], economic situation, and speaker (see appendix for methodological details). We observe various local maxima: 1989, 1992, 2005, 2009, 2015, and 2019. These points coincide with exogenous events that helps us explain the rises and falls of the Amazon in presidential discourse.

First, we observe a steady increase from about 5% in 1985 to 32% 1989. This is the period when the Brazilian Constitution was being written. Indigenous and traditional populations were instrumental in advocating for constitutional environmental rights and protection of their territories (**?**). These were eventually enshrined in article 225, which gives all Brazilians a right to a balanced environment, and in article 231, which grants indigenous and traditional populations a right over their territory. Two other factors are likely to explain this increase: in 1988 Chico Mendes was brutally murdered and the New York Times published an article with pictures of the Amazon burning (**?**). Both incidents caught unprecedented international attention. President Sarney responded to these publicly, and proposed a new set of policies to address, named Nossa Natureza (**?**).

Share of speeches mentioning the Amazon by year

Sample composed by 6130 presidential speeches since 1985

Real share — Predicted share
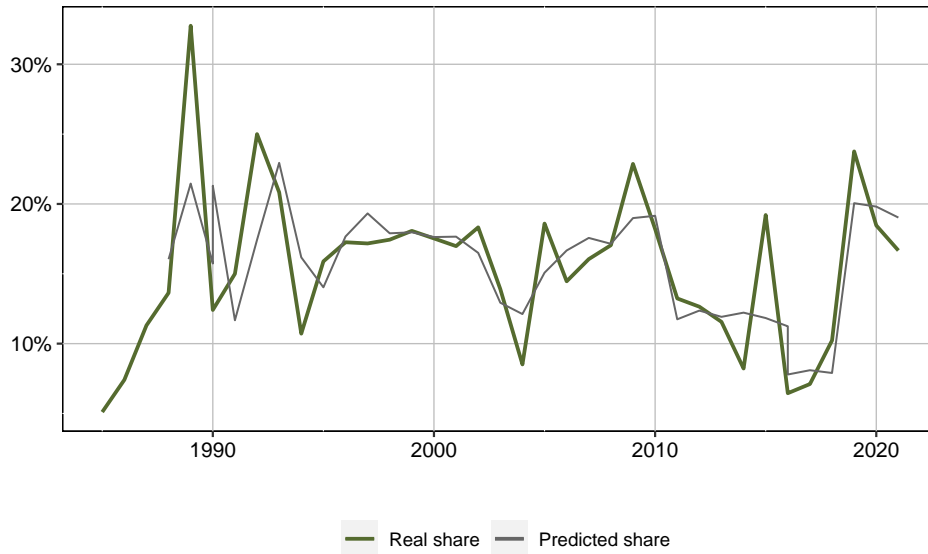
Predicted share controls for deforestation rates, inflation, and president.

While in 1990 there was a decrease to about 12.4%, we observe a novel increase to

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[5]The reasoning here is that knowledge of high or low deforestation rates might drive presidents to speak about the Amazon. Matching deforestation with speech dates is a complicated endeavor. INPE published consolidated deforestation data with almost two years of delay until 2005 (**?**, pp. 60). Preliminary data was published earlier, but with lower degrees of confidence in the findings. For the subsequent years, the consolidated figures for a given year tend to come out in August of the subsequent year. However, it also seems to be the case that the executive government have access to the data before everyone else. In addition, other sources indicating if deforestation is going up or down, as fire data or lower resolution deforestation data (DETER for example), circulates within the same year. The year of 1988 is particularly indicative of these complications: a report dating 1988 was circulating with deforestation and fire figures (**?**), and a New York Times article about the issue was written with comments by an INPE scientist (**?**). Hence, we believe the most appropriate way of matching is without any lags on deforestation.

15% and 25% in 1991 and 1992 respectively. The driver of this increase is likely to be the 1992 Earth Summit, which was being prepared by various state and non-state actors in the region and brought international attention to environmental topics in Brazil. One of the big announcements was the consolidation of the first transnational partnership for the Amazon, the G7 Pilot Programme, which brought a high number of financial resources to the region for public policy implementation (**?**). During the Cardoso years (1994-2002), Amazonian speeches averaged at about 16% without strong variation. There were no big international or domestic events that drove the topic up. At the level of policy, though, we saw the birth of the National System of Protected Areas in 2001, and of the Amazon Regional Protected Areas Program. While the former created the legal framework for different types of protected areas to be created, the latter established a transnational partnership to finance the implementation of protected areas in the Amazon (**?**).

We observe an increase from 8.5% in 2004 to 22.8% in the year of the Copenhagen Summit, 2009. This coincides with the Presidency of Lula and the steepest decrease in deforestation rates in Brazilian history. Lula led the delegation to Copenhagen with a self-image of "we do not promise, we deliver" (**?**), when stakes about climate change were high. A somewhat different pattern can be identified in the lead up to the 2015 Paris COP, which was also building up to become a key-turn in climate politics after the failures of Copenhagen. From 2010 to 2014, we identify a steady decrease from 18.2% to 8.2%, which is followed by a sharp increase in the year of the COP, reaching 19.2%. These are the years when Brazil entered a long period of political and economic instability that lingers until today. Brazil went to the COP in Paris with deforestation numbers slightly higher than Copenhagen, and a perception that there was a turn towards less conservation after the 2011 Forest Code was adopted and former environmental minister Marina Silva ended her alliance with the worker's party because of disagreements related to the priority of environmental policy.

We subsequently observe a steady increase from 6.4% in 2016 to almost 24% in the first year of Bolsonaro's presidency, 2019. As the narrative of the climate crisis picks up in the late 2010s, international media attention about the Amazon blasts, reaching unprecedented coverage. Pictures of the Amazon on fire and of the red sky afternoon in São Paulo circulated in social media and international media outlets in 2019. President Bolsonaro engages in an international debacle with President Macron and others, which drove the topic up strongly in the presidential agenda. President Bolsonaro retrieves Brazil's hosting status for COP25, and a strong process of dismantling of environmental governance starts taking place.

We do find evidence that deforestation rates, economic situation, elections, and simply presidential preferences affect the incidence of Amazon in speeches: the smoothed curve portrays lower proportions overall. However, international events and media coverage also correlate with local maxima of our curve, suggesting presidents do speak more about the Amazon in preparation or reaction to these events. We are yet to inspect, though, whether specific problem constructions about the Amazon change over time.

4.2.   *4.2 Amazonian problem-construction in time*

Figure 2 portrays plots with the proportions of different problem constructions over time. We conceptualize four problem constructions: sovereignty, economic integration, social development, and conservation. At the level of the Amazonian statement,

though, presidents might mix two or more together. These are what we call mixed types, in opposition to pure types. There are 16 mix types in total, and figure 2 portrays the most frequent of them. Pure problem constructions dominate, with their joint average above 55%. Among the four pure types as well as the mixed types, we observe a strong variation over time, suggesting the narratives do respond differently to factors that affect Amazonian statements discussed in the section above.

Share of different problem–constructions by year

Sample composed by 2400 problem–constructions in 1885 Amazonian statements in presidential speeches
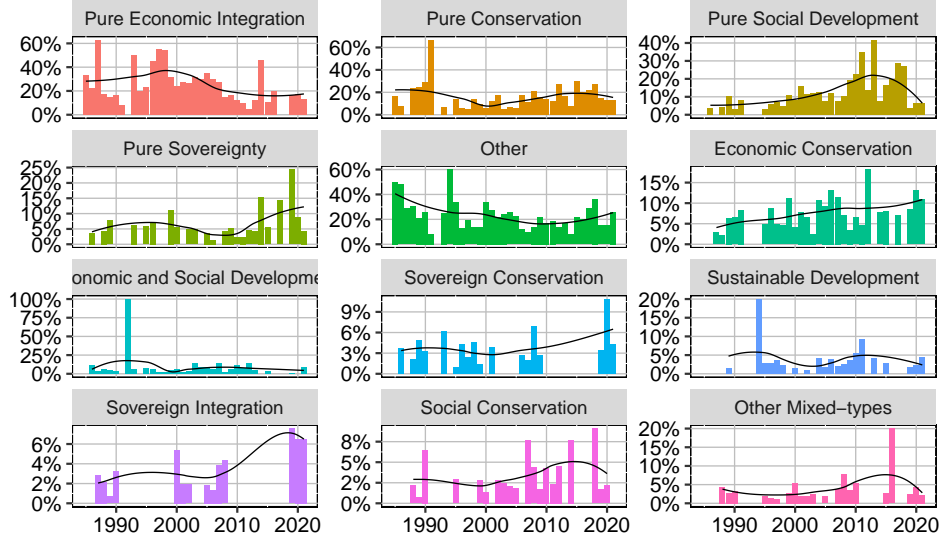
The plots reveal several trends. We start by pure-types. Pure economic integration statements, which were dominant, decreased in incidence as of the mid 1990s. In the late 1990s, pure conservation as well as pure social development increased; both surpassing the proportion of economic integration problem-construction in 2005. **?** argues that the unprecedented decrease in deforestation we observed from 2004 to 2012 was a product of an increase in the perception of stronger federal policies and presence in the Amazon region, which in turn engendered a perception of higher risk of being caught and fined for deforestation. This correlates with our findings: a higher incidence of the Amazon as a topic overall can generate a perception of more attention from the top, and a shift from economic integration to conservation can generate a perception of higher change of being caught. As of the early 2010s, we observe a reversal of the trend with a twist: economic integration starts picking up again in detriment of conservation and social development problem constructions, but with sovereignty increasing steadily.

Figure 3 (below) shows these shift and reversal more clearly and highlights the decrease of economic integration and increase of social and conservation problem constructions preceding Lula's presidential mandate. Relatedly, figure 3 also shows that while the reversal precedes the mandate of President Bolsonaro, it was with him and his dismantling of social and environmental policies that sovereignty and economic integration appears the most, in detriment of social development and environmental conservation. The starkest decrease relates to social development construction between Temer's and Bolsonaro's administration.

Share of each pure types by year

Sample composed by 1885 Amazonian statements in presidential speeches since 1985

Legend: Pure Economic Integration — Pure Conservation — Pure Social Development — Pure Sovereig...
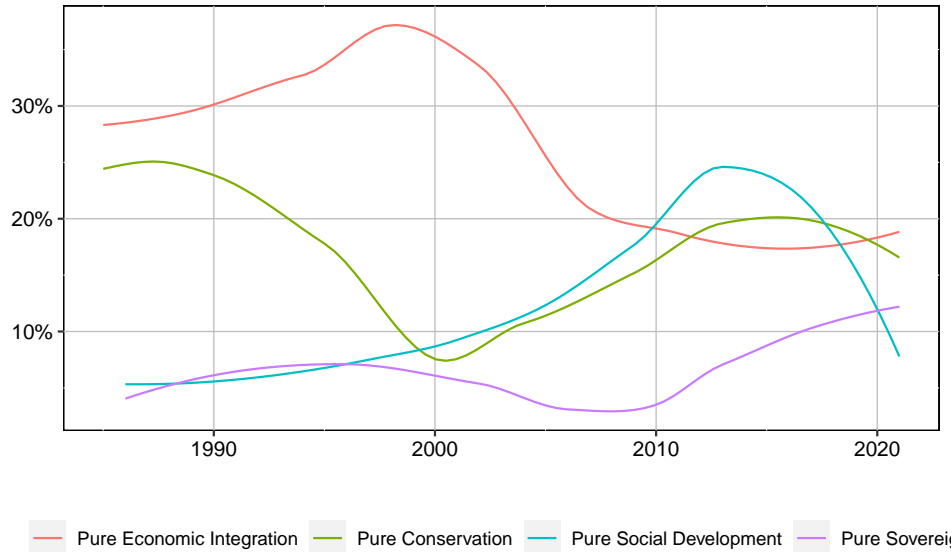
We now move to mixed types, which average at around 21% for all presidents in our sample: overall, presidents prefer pure problem-constructions. While there is some variation in time for each single mixed type, some of them have low counts and interpretations are not adequate. We focus our discussion on those with higher incidence. First, the most frequent mix overall is that of economic integration with conservation, which after reaching 25% of all problem-constructions in 1989, remained stable at 9% on average for the remainder of the period. President Lula was the most frequent user of this mix. Second, except for economic and social development appearing together in all statements made by Color in 1992, mixed types using conservation were quite frequent in the lead up and aftermath of the 1992 Earth Summit. This includes the mix type we label sustainable development, which constructs the Amazon as a problem of economic integration, social development, and environmental conservation. In all, we interpret the appearance of mixed types as more complex understandings of Amazonian problems. This follows a global agenda of understanding interconnections of social, environmental, and economic domains. As we show that Amazonian incidence in discourse does respond to global issues, this is not a surprise given agendas as Millennium Development Goals and the Sustainable Development Goals. Nevertheless, as in pure types, we also observe the comeback of sovereignty being used in mixed types in detriment of conservation. This becomes more apparent in a comparison between Lula and Bolsonaro, the two presidents that mix the most with proportions 11% above presidential averages: 29.5% and 31.3% respectively. While the former frequently mixed conservation with other problem constructions, the latter prefers mixing sovereignty. The combination of sovereignty with economic integration, which was also characteristic of the military dictatorship policies for the region, reaches its highest level with Bolsonaro.

Share of each mixed type problem–constructions by president

Sample composed of Amazonian statements that were coded as a mixed–type (n=431)
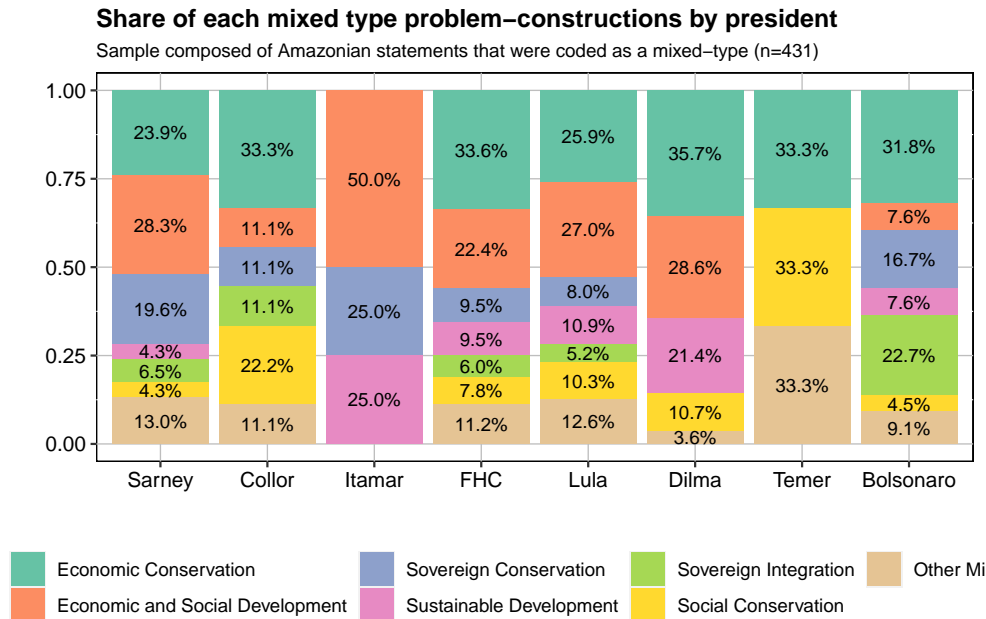
? proposes that we see the Amazon frontier as a key analytic category to understand the Brazilian state and democracy. Specifically, the author states that the natural richness of the region has been instrumentally transformed in political support through resource exploration by different governments over the last centuries. The costs for said economic and political benefits are the livelihoods of indigenous and traditional populations and the ecosystems they reside in. Political stability, thus, can be seen as a product of the trade-off between both. Policies during the military dictatorship were strongly geared towards integrating the Amazon to the national territory and international economy. With the strengthening of environmentalism in the 1990s, its most strong form being the policies adopted in the 2000s, we can interpret the fall of economic integration and the rise of social and conservation problem constructions as a new relationship between granting local livelihoods their rights and economic exploitation.

While unprecedented, this new balance was not long-standing. Democratic decay is slow and the embryo of Bolsonaro's Amazonian discourse was breeding half a decade before he took office. We observe the decrease in conservation related statements in the early 2010s, and the soft increase of sovereignty in form of mixes in the mid 2000s (figure 3) . The hard increase in sovereignty comes in the 2010s. As we conceptualize and operationalize sovereignty as boundary-making vis-à-vis internal and external perceived threats to the Amazon, we interpret this increase as attacks to indigenous and traditional populations. At the policy side, the Itaipu Dam in the late 2000s and the 2011 Forest code are seen as a turning point: political opposition to conservation got particularly organized and managed to lobby the executive and conquer this policy wins, which were largely opposed by environmentalists.

This is not to say that those who preceded President Bolsonaro are like him. They are not, and we have shown how he is different from others already. But the political forces in Brazilian democracy that drive these changes in problem-construction were long in the making, as the earlier and softer shifts in discourse suggest. Bolsonaro's problem-construction is the strongest form of this shift. Now that we've inspected and developed pure and mixed types, we can check if these specific problem constructions

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vary depending on where the president is speaking.

4.3. *4.3 An Amazonian three-level game? Boasting policy outside, talking to people inside*

Table 2, below, displays the multinational regression coefficients for the correlation between diverse problem constructions and locations. For locations, the reference category is Amazonian states and, for problem construction, the reference category is environmental conservation. From the outset, we notice that problem constructions of pure economic integration and pure social development correlate in negative statistically significant ways to both international settings and Brasilia in relation to environmental conservation problem constructions in Amazonian states. These findings indicate that constructing the amazon as an issue of environmental conservation is more likely to happen in international settings and in Brasilia than in Amazonian states. Additionally, pure sovereignty constructions correlate in negative statistically significant ways to international settings in relation to environmental conservation constructions in Amazonian states. That is, constructing the Amazon as an issue of sovereignty

```
## # weights:  88 (70 variable)
## initial  value 4416.923092
## iter  10 value 4017.522240
## iter  20 value 3850.674388
## iter  30 value 3699.438241
## iter  40 value 3676.058797
## iter  50 value 3674.521349
## iter  60 value 3674.391978
## final   value 3674.391362
## converged
```

```
##
## ===========================================================================
##                                          Dependent variable:
##              ----------------------------------------------------------------
##                EI       SD       Sov     EI-Con    EI-SD    Sov-Con   SD-EI-
##                (1)      (2)      (3)      (4)       (5)      (6)       (7)
## --------------------------------------------------------------------------
## Brasilia      -1.024*** -1.002*** -0.206   -0.341   -1.019***  0.420   -1.197
##               (0.169)  (0.205)  (0.260)  (0.248)  (0.273)  (0.257)   (0.33
##
## International -0.612*** -1.583*** -1.427*** -0.265   -0.980*** -0.451   -1.110
##               (0.192)  (0.303)  (0.431)  (0.292)  (0.336)  (0.367)   (0.40
##
## Non-AM state   0.023   -0.041    0.324    0.149    0.071    0.823***  -0.46
##               (0.197)  (0.230)  (0.302)  (0.296)  (0.292)  (0.306)   (0.37
##
## Election      -0.241    0.028   -0.684**  -0.059   -0.254   -0.573    0.06
##               (0.186)  (0.215)  (0.298)  (0.253)  (0.281)  (0.406)   (0.36
##
## Deforestation  0.063*** -0.031*   0.004    0.023    0.047**   0.005    -0.01
```

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```
##                       (0.013)   (0.016)   (0.019)   (0.017)   (0.019)   (0.027)   (0.02
##
## Inflation          -0.001*** -0.0005*** -0.0001  -0.001*** -0.0005**  0.0002   -0.001
##                      (0.0001)  (0.0002)  (0.0002)  (0.0002)  (0.0002)  (0.0002)  (0.000
##
## Constant              0.228   0.852***  -0.599*  -0.762**  -0.981*** -2.041*** -0.794
##                      (0.210)   (0.252)   (0.333)   (0.312)   (0.335)   (0.332)   (0.37
##
## -------------------------------------------------------------------------------------
## Akaike Inf. Crit. 7,488.783 7,488.783 7,488.783 7,488.783 7,488.783 7,488.783 7,488.
## =====================================================================================
## Note:
```

5.   5 Conclusion

6.   Appendices

Any appendices should be placed after the list of references, beginning with the command \appendix followed by the command \section for each appendix title, e.g.

\appendix
\section{This is the title of the first appendix}
\section{This is the title of the second appendix}

produces:

Appendix A. This is the title of the first appendix

Appendix B. This is the title of the second appendix

Subsections, equations, figures, tables, etc. within appendices will then be automatically numbered as appropriate. Some theorem-like environments may need to have their counters reset manually (e.g. if they are not numbered within sections in the main text). You can achieve this by using \numberwithin{remark}{section} (for example) just after the \appendix command.

Please note that if the endfloat package is used on a document containing appendices, the \processdelayedfloats command must be included immediately before the \appendix command in order to ensure that the floats in the main body of the text are numbered as such.

Appendix A. Troubleshooting

Authors may occasionally encounter problems with the preparation of a manuscript using LATEX. The appropriate action to take will depend on the nature of the problem:

(i) If the problem is with LATEX itself, rather than with the actual macros, please consult an appropriate LATEX 2_ε manual for initial advice. If the solution cannot be found, or if you suspect that the problem does lie with the macros, then please contact Taylor & Francis for assistance (latex.helpdesk@tandf.co.uk).

(ii) Problems with page make-up (e.g. occasional overlong lines of text; figures or tables appearing out of order): please do not try to fix these using 'hard' page

make-up commands – the typesetter will deal with such problems. (You may, if you wish, draw attention to particular problems when submitting the final version of your manuscript.)

(iii) If a required font is not available on your system, allow TEX to substitute the font and specify which font is required in a covering letter accompanying your files.

Appendix B. Obtaining the template and class file

B.1. *Via the Taylor & Francis website*

This article template and the `interact` class file may be obtained via the 'Instructions for Authors' pages of selected Taylor & Francis journals.

Please note that the class file calls up the open-source LaTeX packages booktabs.sty, epsfig.sty and rotating.sty, which will, for convenience, unpack with the downloaded template and class file. The template calls for natbib.sty and subfigure.sty, which are also supplied for convenience.

B.2. *Via e-mail*

This article template, the `interact` class file and the associated open-source LaTeX packages are also available via e-mail. Requests should be addressed to `latex.helpdesk@tandf.co.uk`, clearly stating for which journal you require the template and class file.