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RESEARCH ARTICLE

'What is important is seldom urgent and what is urgent is seldom important': a study of the strategic implications of the urgency effect in a competitive setting

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Abstract
The urgency effect refers to people's tendency to choose a relatively unimportant task (with unambiguously low payoff) over a relatively important task (with unambiguously high payoff), when the former is spuriously framed as urgent. In this paper I study a simple model in which two payoff-maximising task suppliers compete for a population of heterogeneous decision-makers. Task suppliers offer tasks of various importance, and can exert costly effort to manipulate the perceived urgency of the offered tasks. Decision-makers are of two kinds: they either choose more important over less important tasks by disregarding the urgency frames (fully rational) or behave like fully rational decision-makers, except that they are subject to the urgency effect (boundedly rational). I study the unique symmetric equilibrium of the resulting game and derive the conditions under which the urgency effect has detrimental effects on the decision-makers' welfare. Furthermore, I examine the implications of several policies aimed at correcting the failure, which include educating boundedly rational decision-makers and auditing task suppliers that use urgency framing.

Keywords Bounded rationality · Framing effects · Urgency effect · Welfare

JEL Classification D01 · D60 · D91

1 Introduction

Framing effects refer to the phenomenon whereby a decision-maker's choice is affected by the way in which the decision problem is presented (Tversky and Kahneman 1981). The economic implications of the DM being subject to framing effects have been investigated in the context of both individual decision-making (Salant and Rubin-

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stein 2008) and strategic decision-making (Piccione and Spiegler 2012). However, surprisingly little attention has been devoted to the study of the so-called *urgency effect*, a behavioural regularity that is closely related to the concept of framing effects. Specifically, the urgency effect refers to people's tendency to select a relatively unimportant task (with unambiguously low payoff) over a relatively important task (with unambiguously high payoff), when the former is *spuriously* framed as urgent.

The urgency effect has been well-documented in the literature. A significant contribution in this respect is Zhu et al (2018), who propose a between-subject experiment, in which subjects have to first choose one out of two *identical* tasks (e.g. write a product review), and then carry it out. The two tasks only differ in two dimensions: task importance and task urgency. Task importance is manipulated by changing the subjects' payoff they can earn by completing the task (money or gift cards). Task urgency, on the other hand, is spurious, in the sense that it is manipulated by creating an *illusion* of expiration.[1] In the control treatment, the urgency frame is held constant, and subjects have to choose between a less important and a more important task. On the other hand, in the urgency treatment, subjects have to choose between a less important task is framed as urgent and a more important task is framed as non-urgent.[2] Zhu et al (2018) find that the percentage of subjects who choose the less important task is systematically greater in the urgency treatment, by showing that their results are robust to changes in both the subject pool and the nature of the real-effort task.[3]

More generally, it is well-known that manipulating individuals' *perceived* time pressure affects the way in which they make decisions. For example, DeDonno and Demaree (2008) and Vermeir and Van Kenhove (2005) provide evidence that confirms this tendency in the context of gambling tasks and shopping behaviour, respectively. More recently, the urgency effect has been successfully utilised in the domain of nudging: an ad campaign aimed at improving gas bill accuracy has been shown to be more effective in inducing customers to self-record gas meter readings, when the ad messages embed a sense of urgency (d'Adda et al 2020).

The purpose of this paper is to investigate the strategic implications of the urgency effect in a competitive setting. In particular, my goal is to propose a simple model in which two *task-suppliers* compete for a population of *decision-makers* by offering tasks of various importance and manipulating the perceived urgency of the offered

[1] In the experiment an illusion of expiration is created by setting a *non-binding* deadline, where by non-binding it is meant that the stated expiration time occurs after the time that is given to subjects to complete the task under consideration has passed.

[2] In both treatments a non-binding deadline is set. However, in the urgency treatment, such non-binding deadline is set to be tighter.

[3] There are a number of valid reasons for which a decision-maker may resolve importance-urgency tradeoffs in favour of urgency. For example, it is often the case that the payoff of an urgent task is realised *sooner* than that of a non-urgent task. As such, if the decision-maker is sufficiently impatient, then they will choose it over a task that is more important, but less urgent (Frederick et al 2002). Another reason could be that, if an urgent task is not carried out by a certain deadline, then there are negative payoff consequences for a decision-maker (e.g. an individual that does not pay a fine by the deadline ends up paying more). Zhu et al (2018) show that people tend to resolve urgency-importance tradeoffs in favour of urgency, even when such valid reasons for resolving urgency-importance tradeoffs in favour urgency are controlled for, i.e., when urgency is *spurious*.

tasks, with the property that a fraction of decision-makers is subject to the urgency effect described above. This question is relevant for a number of reasons.

First, as discussed above, there is ample evidence in support of the urgency effect. Therefore, studying its implications in a competitive setting is important. Second, because the urgency effect may induce sub-optimal choices, it is key to explore the welfare effects of the decision-makers who are subject to it, and investigate whether task suppliers can take advantage of it. Third, there are multiple economically relevant situations in which urgency framing is likely to be used. One example is *lobbying*: Chalmers (2013) studies the tactics used by lobbyists interested in gaining access to the European Union policy-making process. They find that a recurrent strategy employed by lobbyists is to repeatedly convey the exact same message using a range of diverse channels, such as public consultations, emails, and public events, in order to create a sense of urgency. A second example is *firm competition*. It is well-known that competing firms send out ‘scarcity messages’ with the objective of pressuring the consumers into buying their products (Aggarwal et al 2011). In fact, in 2017 the UK Competition and Markets Authority (CMA) formally opened a case against several hotel booking sites for—among other things—‘pressure selling’, which CMA defines as follows:

> *whether claims about how many people are looking at the same room, how many rooms may be left, or how long a price is available, create a false impression of room availability or rush customers into making a booking decision* (Competition and Markets Authority 2017).

The proposed model is very simple and stylised, and builds on Zhu et al (2018)’s urgency experiments summarised above. Specifically, the model assumes that two task suppliers simultaneously choose a pair (x, u), where x is a non-negative real number capturing the importance of the offered task, and u is a urgency frame. Consistently with Zhu et al (2018)’s experiment, u is a *binary variable*, with the properties that $u = 1$ (resp., $u = 0$) is interpreted as framing a task urgent (resp., non-urgent). Offering tasks of higher importance is costly as well as framing them urgent. The underlying idea is that all the offered tasks have a non-binding completion window, but task suppliers can exert costly effort in order to induce decision-makers to *perceive* them to be urgent. Task suppliers compete for a continuum of decision-makers, who have to choose one task among those that are offered by the task suppliers. Like in framing effects, urgency frames do not have any payoff-relevant consequences for decision-makers, but may affect the way in which they make the task selection. Specifically, a fraction $\beta \in [0, 1]$ of decision-makers choose more important over less important tasks by disregarding the urgency frame. Such decision-makers are referred to as *fully rational*, as they are immune to urgency framing. On the other hand, fraction $1 - \beta$ of decision-makers are vulnerable to urgency framing and, as such, are subject to the urgency effect. That is, they behave exactly like the fully rational ones with one exception: because of the urgency effect, they resolve any importance-urgency tradeoff in favour of urgency, by selecting less important tasks that are framed as urgent over more important tasks that are framed as non-urgent. This second class of decision-makers is referred to as *boundedly rational*.

Because framing a task urgent is costly and fully rational decision-makers are immune to it, task suppliers have an incentive to offer tasks of high importance by framing them non-urgent in order to appeal to fully rational decision-makers. However, at the same time, task suppliers also want to offer tasks of low importance by framing them urgent in order to exploit the urgency effect boundedly rational decision-makers are subject to. This strategic tradeoff lies at the heart of the proposed model.

The rest of the paper is structured as follows. Section 2 reviews the related literature; Sect. 3 defines the model; Sect. 4 presents the equilibrium analysis; Sect. 5 conducts the welfare analysis; Sect. 6 studies the policy implications of the model; Sect. 7 concludes by summarising the main contribution of the paper, and discussing limitations and potential extensions. The proofs along with additional material are contained in the supplement.

2 Related literature

To the best of my knowledge, this is the first paper that studies the implications of the urgency effect in a competitive setting. However, it shares various features with a number of studies (Piccione and Spiegler 2012; Bachi and Spiegler 2018; Gerasimou 2018). Piccione and Spiegler (2012), for instance, investigates the implications of consumers being subject to framing effects in a price-competition model. In their paper, framing strategies affect the probability with which consumers make a price comparison. In contrast, this paper studies a quality-competition model, and framing strategies influence the way in which decision-maker trade off task importance and perceived task urgency.

On the other hand, Gerasimou (2018) adopts a choice-theoretic approach to study the implications of decision-makers experiencing difficulties in resolving tradeoffs between conflicting attributes. In contrast, the proposed model considers a competitive setting. On a related note, Bachi and Spiegler (2018) study a quality-competition model in which firms offer two-dimensional products and consumers avoid tradeoffs between attributes altogether. The closest variant of their model to this paper is the one whereby consumers resolve tradeoffs by sampling a dimension and choosing the dominant market alternative along the sampled dimension (with a symmetric tie-breaking rule).[4] The proposed framework is different, because the decision-makers of this paper adopt a distinct choice procedure. Moreover, unlike Bachi and Spiegler (2018), this model—as it will become clear in the sequel—has the features of an all-pay auction.[5]

[4] See also Papi (2014), who studies a Stackelberg market game in which consumers use a two-stage procedure: consumers first simplify complex problems by discarding all alternatives that do not possess some salient attribute and then choose by maximizing an utility function among any alternatives that survive. In contrast, this paper considers a simultaneous interaction, and decision-makers adopt either a utility-maximising (fully rational) or a lexicographic (boundedly rational) choice rule.

[5] A third difference is that in their model both dimensions are continuous and the cost function is additively separable across dimensions and linear within dimensions. Instead, this model assumes that that one dimension (importance) is continuous and the other dimension (urgency) is—in line with the urgency experiments—discrete and the cost function is additively separable across dimensions, but not necessarily linear within dimensions.

Finally, from a methodological standpoint, the proposed framework adopts an approach that is common in the behavioural industrial organisation literature, in that it explores the implications of payoff-maximising competitors interacting with decision-makers that are subject to a well-documented bias (Spiegler 2011; Heidhues and Kőszegi 2018), and—as illustrated below—conducts the welfare analysis by using behavioural welfare-economics tools (Bernheim and Rangel 2007; Salant and Rubinstein 2008).

3 The model

Let $X := [0, +\infty)$ be a set of tasks. A task x is more important than a task y whenever $x > y$. Tasks are offered by *two* task suppliers who compete for a population of decision-makers. Consistently with the experiments discussed in the introduction, the interpretation is that each task $x \in X$ is characterised by a completion window whose deadline is not binding for the decision-makers. However, task suppliers have the opportunity to *frame* the offered task as urgent by exerting costly effort. In particular, each supplier simultaneously chooses $(x, u) \in X \times \{0, 1\}$, where $x \in X$ is a task of importance x and $u \in \{0, 1\}$ is an urgency frame. Following the urgency experiments, perceived urgency is modelled as a binary variable, where I interpret $u = 0$ as framing a task non-urgent and $u = 1$ as framing a task urgent.[6]

Let $c : X \to \mathbb{R}$ denote the task-importance cost function. Throughout, I assume that $c(x)$ is continuous, twice differentiable, and strictly increasing, and that $c(0) = 0$, i.e., offering a task of no importance is costless. I make no further assumptions on the functional form or curvature of $c(x)$. Let $d : \{0, 1\} \to \mathbb{R}$ denote the perceived task urgency cost function, where it is assumed that framing a task non-urgent is costless ($d(0) = 0$) and framing a task urgent has a cost of $d(1) = c_f \geq 0$. Parameter c_f, which I refer to as 'framing cost', can be interpreted as the cost in terms of time and/or money to induce a decision-maker to *perceive* the offered task to be urgent. For simplicity, the total cost of offering (x, u) is additively separable, and given by $c(x) + d(u)$. In the conclusions I discuss the role that this assumption plays in shaping the paper's findings, and argue that departing from additive separability by considering different classes of cost functions produces qualitatively similar results.

I assume that there is a unit mass of decision-makers that have to perform *one* task.[7] Consistently with the urgency experiments discussed in the introduction, urgency frames do not have direct payoff-relevant consequences on decision-makers, but may

[6] In the conclusions, I discuss the implications of relaxing this assumption.

[7] A justification could be that their outside option yields a payoff that is inferior to that of choosing the least important task. In the context of the hotel-booking example previously discussed, a consumer has to purchase *at least one* holiday package, because otherwise they will do a 'stay-cation'. However, at the same time, the consumer will be able to purchase *at most one* holiday package, as they cannot do more than one holiday per season.

affect the way in which they make the task selection.[8] In particular, fraction $\beta \in [0, 1]$ of decision-makers are assumed to be *fully rational* (FR). FR decision-makers select more important over less important tasks, by disregarding the frame (with a symmetric tie-breaking rule). On the other hand, fraction $1 - \beta$ of decision-makers are *boundedly rational* (BR). These behave exactly like FR decision-makers with one exception: because of the well-documented *urgency effect* discussed above, BR decision-makers choose the urgent tasks that are less important over the non-urgent tasks that are more important. Formally, given $(x, 1), (y, 0) \in X \times \{0, 1\}$ with $x \leq y$, BR decision-makers choose $(x, 1)$ over $(y, 0)$, due to the urgency effect.[9]

Task suppliers are payoff-maximising, risk-neutral decision-makers that compete for decision-makers. If the decision-makers perform the task supplied by task supplier i, task supplier i is rewarded a certain amount v, which I normalise to 1. If the decision-makers do not perform the task supplied by task supplier i, task supplier i obtains a zero reward, and ties are randomly broken.[10] The proposed model induces a simultaneous two-player game with perfect and complete information. The justification for the proposed model being static is three-fold. First, the perceived urgency of an offered task does not embed any *real* dimension of time, because perceived task urgency is purely framing. Second, as discussed above and consistently with the urgency experiments, the interpretation is that all tasks in $x \in X$ have a completion window whose deadline is not binding for the decision makers. Because decision-makers have to select only *one* task, they are not involved in a 'priority choice' whereby they have to choose which task to carry out *earlier* and which task to carry out *later*. Third, from the point of view of the task suppliers, there are real-world situations—including those discussed in the introduction—in which importance and perceived-urgency decisions are made simultaneously.

Letting $i, j \in \{1, 2\}$ and $i \neq j$, task supplier i's payoff function $\pi_i(\cdot)$ induced by the proposed model is given by the probability that decision-makers choose the task supplied by task supplier i minus total costs, and is defined as follows.

[8] As discussed in the introduction, there are real-world situations in which urgency framing is likely to be used, and competitors exert costly effort to manipulate the *perceived* urgency of the offered tasks (e.g. lobbying). On the other hand, there are also real-world situations in which task urgency is genuine, in the sense that failing to complete an urgent task on time leads to negative payoff consequences (e.g. failing to pay a fine by the deadline). Building on the well-documented urgency effect, this paper studies (and is relevant for) the first class of situations by investigating the strategic use of urgency frames in a competitive setting when urgency is *spurious*. In the conclusions, I further elaborate on this point by discussing how—in an independent paper - the second class of situations could be modelled.

[9] Strictly speaking, in order to capture the tradeoff between task importance and perceived task urgency, the inequality '$x \leq y$' in the definition of the urgency effect should be *strict*. The reason for which it has been defined differently is for interpretation purposes: throughout it is assumed that, unlike FR decision-makers, BR decision-makers are vulnerable to urgency framing. As such, in order for the model to be consistent with this interpretation, when there is a tie along the importance dimension and one of the two tasks is framed as urgent, BR decision-makers have been assumed to choose the urgent task with probability 1. However, observe that whether the inequality under consideration is assumed to be weak or strict in the definition of the urgency effect does not matter much for the equilibrium analysis, because ties along the importance dimension occur with zero probability in equilibrium under both variants of the model.

[10] Observe that if there is only one task supplier (i.e., a monopolist), then in 'equilibrium' the offered task is a non-urgent task of no importance, which guarantees unit payoff to the monopolist.

$$\pi_i((x_i, u_i), (x_j, u_j)) := \begin{cases} 1 - c(x_i) - d(u_i), & \text{if } x_i > x_j \text{ and } u_i \geq u_j \\ \beta - c(x_i) - d(u_i), & \text{if } x_i > x_j \text{ and } u_i < u_j \\ \frac{\beta}{2} + 1 - \beta - c(x_i) - d(u_i), & \text{if } x_i = x_j \text{ and } u_i > u_j \\ \frac{1}{2} - c(x_i) - d(u_i), & \text{if } x_i = x_j \text{ and } u_i = u_j \\ \frac{\beta}{2} - c(x_i) - d(u_i), & \text{if } x_i = x_j \text{ and } u_i < u_j \\ 1 - \beta - c(x_i) - d(u_i), & \text{if } x_i < x_j \text{ and } u_i > u_j \\ -c(x_i) - d(u_i), & \text{if } x_i < x_j \text{ and } u_i \leq u_j \end{cases} \tag{1}$$

On the one hand, task suppliers have an incentive to offer non-urgent tasks of high importance in order to appeal FR decision-makers. However, at the same time, task suppliers also want to offer urgent tasks of low importance in order to exploit the urgency effect BR decision-makers are subject to. This strategic tradeoff, which is induced by the payoff function of Eq. 1, is at the core of the proposed model. As discussed in the introduction, potential applications of the proposed model include lobbying and firm competition.[11]

There are two exogenous parameters in the proposed model that will be of particular interest: β and c_f. Observe that, in the light of the above discussion, the framing cost c_f can be interpreted as a metric that measures how difficult it is for suppliers to induce the urgency effect on the BR decision-makers. So, while β measures the *proportion of rational decision-makers* in the population, c_f captures *how rational BR decision-makers are*, where a higher c_f level corresponds to more rational BR decision-makers.

I conclude this section with two remarks that link the proposed model with contest theory and offer an alternative interpretation of the proposed framework.

Remark 1 (Contest Theory) In contest theory, the contest success function is the function that maps the players' efforts into the individual probabilities of winning the contest (Corchón and Serena 2018). As shown in the supplement, the contest success function that is embedded in the payoff function of Eq. 1 is novel, as it can be written as a convex combination of a standard all-pay auction contest success function and a 'lexicographic' contest success function, in which one effort dimension (the task-urgency dimension) is more important than the other effort dimension (the task-importance dimension) in determining the winning probability. In particular, the proposed contest success function reduces to that of a standard symmetric all-pay auction if and only if $\beta = 1$.[12]

Remark 2 (Stochastic-Choice Interpretation) Consider a variant of the proposed model in which there is one class of DMs that at every strategy profile $((x_i, u_i), (x_j, u_j))$

[11] For example, in the context of lobbying, a task supplier can be interpreted as an interest group offering (x, u), where x is a policy they would like the policy-maker to pursue, and u denotes whether or not pursuing policy x is framed as an urgent matter. Decision-makers are policy-makers who choose between different interests to look after, that are more or less important (e.g. to the society), and that are perceived to be more or less urgent.

[12] In the supplement, I explicitly formulate the contest success function that is induced by the payoff function of Eq. 1. In addition, I explain how the proposed model relates to the static contest-theory literature, by discussing how the proposed framework relates to other papers that study contests with multi-dimensional effort.

behave as follows. When task suppliers choose the same urgency frame—i.e., $u_i = u_j$—DMs choose the most important task. On the other hand, when task suppliers choose distinct urgency frames—i.e., $u_i \neq u_j$—with probability β, DMs choose the most important task, and, with probability $1 - \beta$, they choose the most urgent task.[13]

This formulation constitutes a conceptually different but formally equivalent interpretation of the proposed model. Observe that this formulation is related to the stochastic-choice literature (e.g. see Manzini and Mariotti 2018), in the sense that when task suppliers select different urgency frames, DMs randomly select the criterion—in this case, either task importance or perceived task urgency—that they use to make a decision.

4 Equilibrium analysis

Throughout I will denote a symmetric mixed strategy by $\sigma = \langle p, F_0, F_1 \rangle$, where F_u is the cdf a supplier uses to randomise over task importance conditional on urgency frame $u \in \{0, 1\}$, and p (resp., $1 - p$) is the probability that the supplied task is framed non-urgent (resp., urgent). In addition, I will write f_u to denote the pdf associated with the cdf F_u, with $u \in \{0, 1\}$.

I begin by studying the benchmark case in which decision-makers are FR ($\beta = 1$).

Remark 3 (Benchmark: FR decision-makers) Assume that $\beta = 1$. In every symmetric equilibrium, suppliers randomise over importance according to the cdf of Eq. 2

$$F_u(x; \beta, c_f) = \begin{cases} c(x), & x \in [0, c^{-1}(1)] \\ 1, & x > c^{-1}(1) \end{cases} \tag{2}$$

with the property that, if $c_f > 0$, then $p = 0$.

When decision-makers are FR, it does not make sense for suppliers to frame their tasks urgent (unless the framing cost parameter $c_f = 0$, in which case they are indifferent). As a result, like in a basic all-pay auction, suppliers randomise over task importance according to the cdf of Eq. 2.

I now consider the case of both FR and BR decision-makers in the population.

Proposition 1 (Heterogeneous decision-makers) *There exists a unique symmetric equilibrium strategy—denoted σ^H—with the following properties.*

i *If $c_f \geq 1 - \beta$, then $p = 1$ and the cdf that suppliers use to randomise over importance is that of Eq. 2.*
ii *If $c_f < 1 - \beta$, then $p = \frac{c_f}{1-\beta}$. Moreover,*

   a *if $c_f \in \left[\frac{1-\beta}{2}, 1 - \beta\right)$, the cdfs that suppliers use to randomise over importance are those of Eqs. 3 and 4.*

[13] Unless specified otherwise, ties are randomly broken.

$$F_0(x;\beta,c_f)=\begin{cases}\frac{(1-\beta)}{c_f(1+\beta)}c(x), & x\in\left[0,c^{-1}\left(\frac{1+\beta}{1-\beta}(1-\beta-c_f)\right)\right]\\ \frac{c(x)(1-\beta)-\beta(1-\beta-c_f)}{c_f}, & x\in\left[c^{-1}\left(\frac{1+\beta}{1-\beta}(1-\beta-c_f)\right),c^{-1}\left(c_f+\beta\right)\right]\\ 1, & x>c^{-1}\left(c_f+\beta\right)\end{cases} \tag{3}$$

$$F_1(x;\beta,c_f)=\begin{cases}\frac{1-\beta}{(1+\beta)(1-c_f-\beta)}c(x), & x\in\left[0,c^{-1}\left(\frac{1+\beta}{1-\beta}(1-\beta-c_f)\right)\right]\\ 1, & x>c^{-1}\left(\frac{1+\beta}{1-\beta}(1-\beta-c_f)\right)\end{cases} \tag{4}$$

b *If* $c_f<\frac{1-\beta}{2}$*, the cdfs that suppliers use to randomise over importance are those of Eqs.* 5 *and* 6*.*

$$F_0(x;\beta,c_f)=\begin{cases}\frac{(1-\beta)}{c_f(1+\beta)}c(x), & x\in\left[0,c^{-1}\left(c_f\frac{1+\beta}{1-\beta}\right)\right]\\ 1, & x>c^{-1}\left(c_f\frac{1+\beta}{1-\beta}\right)\end{cases} \tag{5}$$

$$F_1(x;\beta,c_f)=\begin{cases}\frac{1-\beta}{(1+\beta)(1-\beta-c_f)}c(x), & x\in\left[0,c^{-1}\left(c_f\frac{1+\beta}{1-\beta}\right)\right]\\ \frac{(1-\beta)c(x)-c_f\beta}{1-\beta-c_f}, & x\in\left[c^{-1}\left(c_f\frac{1+\beta}{1-\beta}\right),c^{-1}(1-c_f)\right]\\ 1, & x>c^{-1}(1-c_f)\end{cases} \tag{6}$$

iii *Each task supplier's equilibrium payoff is zero.*

Figure 1 displays the structure of the equilibrium support of F^0 and F^1 in the different cases.

The interpretation of proposition 1 is as follows. When the framing cost is sufficiently high relative to the fraction of BR decision-makers (Proposition 1(*i*) and top left panel of Fig. 1), offering urgent tasks characterised by high importance in order to appeal to FR decision-makers does not make sense. The reason is because FR decision-makers are framing immune, and it is cheaper to appeal to them by offering important tasks that are framed as non-urgent. Hence, the only potentially profitable deviation is to offer urgent tasks that are characterised by relatively low importance in order to appeal to BR decision-makers. However, the market shares the deviant supplier would obtain in doing so do not offset the cost, which is given by the framing cost. Hence, task suppliers are better off by offering only non-urgent tasks. As a result, no urgency effect occurs in equilibrium.

As the framing cost moderately decreases (Proposition 1(*ii.a*) and top-right panel of Fig. 1), the effect on the equilibrium is three-fold. First, given that the framing cost is smaller than that of the benchmark case and there *are* BR decision-makers in the population, competitive forces imply that task suppliers have an incentive to offer urgent tasks as well, in order to induce the urgency effect. However, in this case non-urgent tasks are still prevalent, because the framing cost is not low enough. Second, the probability that the urgency effect occurs in equilibrium is now strictly positive, precisely because both urgent and non-urgent tasks are offered in equilibrium. Third, thanks to the urgency effect, task suppliers can afford to reduce the maximum importance of

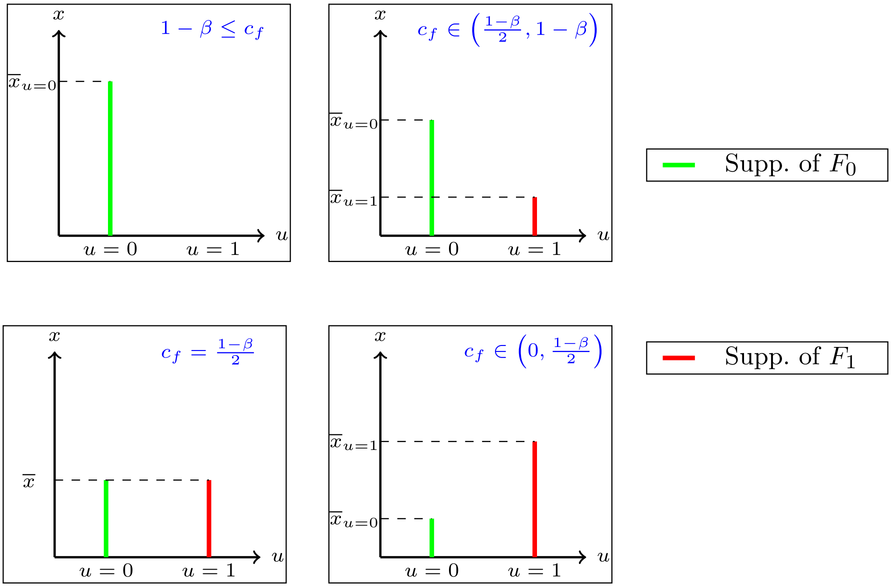

Fig. 1 Structure of the Equilibrium Support of F_0 and F_1 at σ^H

the non-urgent tasks, relative to the benchmark case. This means that the upper bound of the support of F_0 in this case is strictly smaller than that in the benchmark case. The reason is that BR decision-makers resolve the urgency-importance tradeoff in the wrong way, by choosing dominated tasks. This observation, as it will become clear in the sequel, will have significant implications on the decision-makers' welfare.

As the framing cost further decreases, the effect on the equilibrium is that the support of F_0 keeps shrinking and the support of F_0 keeps expanding. A noteworthy case is when $c_f = \frac{1-\beta}{2}$ (bottom-left panel of Fig. 1). In this case, urgent and non-urgent tasks are equally likely, and the maximum importance of urgent and non-urgent tasks is minimised and identical across frames. As the framing cost progressively approaches zero, competitive forces imply that urgent tasks now become prevalent (Proposition 1(*ii.b*) and bottom-right panel of Fig. 1). Moreover, because the mixing between urgent and non-urgent frames gradually decreases, so does the probability that the urgency effect occurs. Specifically, in the polar case in which $c_f = 0$, only urgent tasks are offered in equilibrium, and, interestingly, like in the benchmark case, the probability of the urgency effect is again equal to zero.

Observe that task $(x, u) = (0, 0)$—i.e., a task of lowest importance that is framed as non-urgent—is part of the equilibrium support if and only if the framing cost is strictly positive ($c_f > 0$). Observe that offering such task against the equilibrium mixed strategy σ^H generates zero payoff, because $c(0) = d(0) = 0$ (costs are zero) and decision-makers choose this task with probability zero. This implies that when $c_f > 0$, task suppliers equilibrium payoff is zero. On the other hand, when $c_f = 0$, task $(x, u) = (0, 0)$ is not part of the equilibrium support, because all the offered tasks are framed as urgent. However, notice that task $(x', u') = (0, 1)$ is part of the equilibrium support, and offering such task against the equilibrium mixed strategy σ^H yields zero payoff, because $c(0) = d(1) = 0$, and decision-makers choose such a task with probability zero. Hence, task suppliers make zero payoffs, irrespective of the values taken on by the parameters of the model (Proposition 1(*iii*)).

A further implication of proposition 1 is that F_0 and F_1 are related by first-order stochastic dominance (FOSD), where the direction of the relation depends upon the magnitude of the framing cost relative to the 'amount of rationality' in the agent population. In particular, F_0 FOSD F_1 whenever $c_f \geq \frac{1-\beta}{2}$. As indicated in coroll. 1, this has implications on the equilibrium correlation between task importance and urgency and, as such, provides testable implications of Eisenhower's quote that gives the title to the paper.

Corollary 1 (Eisenhower's Quote) *At the symmetric equilibrium strategy σ^H of proposition 1, the following conditions are equivalent.*

(i) *F_0 first order stochastically dominates F_1.*
(ii) $c_f \geq \frac{1-\beta}{2}$.
(iii) *Task importance and perceived task urgency are negatively correlated.*

5 Welfare analysis

As shown in proposition 1(iii), task suppliers make zero payoff in equilibrium. As such, the welfare analysis will be devoted to the study of the *decision-makers' welfare*. Recall that urgency frames affect the way in which decision-makers select tasks, and—as shown in the previous section—how task suppliers design the importance of the offered tasks in equilibrium. However, from the point of view of the decision-maker's welfare, urgency frames are irrelevant, because they are just ways of framing a task. Therefore, following the behavioural welfare-analysis literature (Bernheim 2009; Rubinstein and Salant 2011), a pair (x, u) will be considered to be welfare superior to a pair (x', u') if and only if $x \geq x'$, i.e., the only welfare-relevant dimension for the decision-makers is task importance, and framing is welfare-irrelevant.[14] As such, I begin the welfare analysis by investigating the average level of task importance that is offered by task suppliers at the equilibrium of Proposition 1.

Given a symmetric mixed strategy σ, I denote average task importance by $\mathbb{E}_\sigma[\cdot]$, and define it as follows.

$$\begin{aligned}\mathbb{E}_\sigma[x; \beta, c_f] &:= p \cdot \mathbb{E}_\sigma[x|u = 0; \beta, c_f] + (1 - p) \cdot \mathbb{E}_\sigma[x|u = 1; \beta, c_f] \\ &= p \int x \cdot f_0(x; \beta, c_f)\, dx_{u=0} + (1 - p) \int x \cdot f_1(x; \beta, c_f)\, dx_{u=1}\end{aligned} \tag{7}$$

[14] In Bernheim (2009), frames are called 'ancillary conditions' and refer to the '*feature of the choice environment that may affect behavior, but is not taken as relevant to a social planner's evaluation*'. On the other hand, in the language of Rubinstein and Salant (2011), the decision-maker's underlying preference relation $\succeq^*$ on $(X \times \{0, 1\})^2$ that reflects their welfare is defined as in the main body—i.e., $(x, u) \succeq^* (x', u')$ whenever $x \geq x'$—and the 'distortive mechanism' is the urgency effect, which causes the BR decision-makers to select $(y, 1)$ over $(y', 0)$ when $y \leq y'$.

Corollary 2 (Equilibrium Average Task Importance) *Let σ^H denote the symmetric equilibrium strategy of proposition 1 and $\mathbb{E}^*_{\sigma^H} := \mathbb{E}_{\sigma^H}[x; \beta = 1, c_f]$. Then, the following statements are equivalent.*

(a) $\mathbb{E}_{\sigma^H}[x; \beta, c_f] < \mathbb{E}^*_{\sigma^H}$.
(b) $p \in (0, 1)$.
(c) *The probability that BR decision-makers experience the urgency effect is positive, i.e.,*

$$2 \cdot p \cdot (1 - p) \cdot \left[\int_0^{\bar{x}_{u=1}} \left(1 - \int_0^{x_{u=1}} f_0(x)\, dx_{u=0} \right) f_1(x)\, dx_{u=1} \right] > 0 \quad (8)$$

The significance of coroll. 2 is three-fold. First, the mere urgency effect *can* induce a reduction in the decision-makers' overall welfare, as under certain conditions the equilibrium average task importance is strictly smaller than that in the benchmark case (denoted $\mathbb{E}^*_{\sigma^H}$). However, introducing some BR decision-makers in the population is not sufficient to do so, because BR decision-makers do not necessarily experience the urgency effect.

Second, a BR decision-maker experiences the urgency effect if and only if there exist an equilibrium realisation $((x_i, u_i), (x_j, u_j))$ with the properties that $x_i \leq y_i$ and $u_i > u_j$. The probability that such realisation occurs in equilibrium is given in Eq. 8 (coroll. 2(c)), and a necessary condition for it to be positive is that both urgent and non-urgent tasks are offered, i.e., $p \in (0, 1)$. Corollary 2(b) demonstrates that in equilibrium this condition is also sufficient for the urgency effect to happen, and that decision-makers experience an overall welfare loss if and only if task suppliers mix between urgent and non-urgent frames in equilibrium, or—equivalently—BR decision-makers experience at least *some* urgency effect. In other words, task suppliers adopt *spurious task differentiation* by offering both urgent and non-urgent tasks with positive probability, in order to trigger the urgency effect. As discussed above, the urgency effect enables task suppliers to reduce the importance of the offered tasks, thus resulting in a reduction of welfare for the decision-makers.

Third, one may conjecture that an external observer, such as a policy-maker, can use Eisenhower's quote as a tool to infer the presence of welfare losses. That is, when in a competitive setting it is observed that most of the offered tasks are framed as urgent, then—because of the negative correlation between importance and urgency predicted by Eisenhower's quote—it is likely to expect that the importance of the offered tasks is relatively low, which results in a somewhat low welfare level relative to the situation in which most the offered tasks are instead framed as non-urgent. The derived results indicate that this conjecture is false in the context of the proposed model, because a welfare loss is equally likely to occur in a situation in which the importance-urgency correlation is either positive *or* negative. Specifically, by proposition 1 and coroll. 2, a welfare loss occurs if, and only if the framing cost lies in the interval $c_f \in (0, 1 - \beta)$. However, by coroll. 1, importance and urgency are negatively correlated if, and only if, $c_f \geq \frac{1-\beta}{2}$.

Corollary 2 derives necessary and sufficient conditions for the unconditional average level of task importance that is offered by task suppliers to fall below that of the benchmark case. However, because FR and BR decision-makers differ in the way in which they make the task selection, it is also important to compare the average level of task importance *that is chosen* by the two classes of decision-makers.

Corollary 3 (Average Chosen Task Importance-BR vs FR Decision-Makers) *At the symmetric equilibrium σ^H of proposition 1, the following conditions hold.*

(i) *The average level of task importance that is chosen by BR decision-makers is identical to that chosen by FR decision-makers if and only if task suppliers do not mix between urgency frames, i.e., when either $c_f \geq 1-\beta$ or $c_f = 0$.*
(ii) *The average level of task importance that is chosen by BR decision-makers is strictly smaller than that chosen by FR decision-makers if and only if task suppliers mix between urgency frames, i.e., when $c_f \in (0, 1-\beta)$.*
(iii) *The difference in the average level of task importance that is chosen by BR decision-makers and FR decision-makers is maximised whenever task suppliers mix between urgency frames and urgency and importance are negatively correlated, i.e., when $c_f \in \left(\frac{1-\beta}{2}, 1-\beta\right)$.*

As expected, according to (i) and (ii), BR decision-makers are worse off than FR decision-makers if and only if task suppliers mix between urgency frames. Interestingly, (iii) indicates that the welfare gap between BR and FR decision-makers is maximised when task suppliers mix between frames *and* there is a negative urgency-importance correlation, i.e., when $c_f \in \left(\frac{1-\beta}{2}, 1-\beta\right)$. The reason for this result is as follows. As discussed above, at the equilibrium realisations in which the urgency effect is triggered, BR decision-makers always choose tasks that are framed as urgent with probability one. Recall from corollary 1(i) that F_1 FOSD F_0 whenever $c_f \leq \frac{1-\beta}{2}$ and F_0 FOSD F_1 whenever $c_f \geq \frac{1-\beta}{2}$. Therefore, it follows that BR decision-makers are particularly worse off when F_0 FOSD F_1, as in those instances they are more likely to select dominated tasks relative to the realisations in which F_1 FOSD F_0.

The main message of this section is that, when task suppliers adopt spurious task differentiation, competitive forces fail to prevent the urgency effect from inducing an overall welfare loss on the decision-makers. In the next subsections, I investigate the effectiveness of several policies aimed at inducing firms to increase the average importance of the offered tasks.

6 Policy implications

6.1 Educating BR decision-makers

As discussed above, the framing cost c_f can be interpreted as a metric that measures how rational BR decision-makers are, where higher levels of c_f correspond to more rational BR decision-makers. A natural question is to investigate the effects on the average level of task importance of increasing c_f, i.e., making BR decision-makers more rational.[15]

[15] It can be shown that $\mathbb{E}_{\sigma^H}[x; \beta, c_f]$ is non-decreasing in β. However, expelling BR decision-makers from the population by replacing them with FR decision-makers does not seem to be a feasible policy.

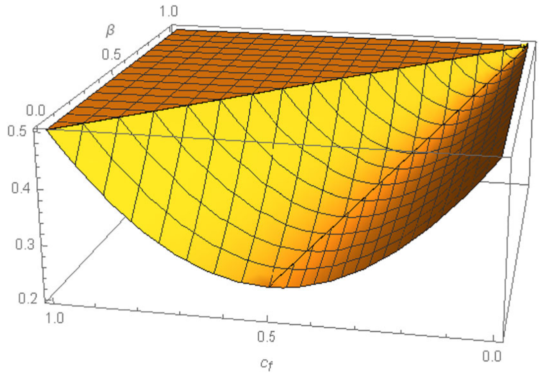

Fig. 2 $\mathbb{E}_{\sigma^H}[x; \beta, c_f]$ as a function of the parameters β and c_f; linear task-importance cost function

Proposition 2 (Educating BR decision-makers) *Let σ^H denote the symmetric equilibrium strategy of proposition 1. Then, $\mathbb{E}_{\sigma^H}[x; \beta, c_f]$ is a U-shaped function of c_f.*

Proposition 2 indicates that increasing the framing cost c_f does not necessarily increase average task importance. In contrast, it turns out that, for a sufficiently small $\epsilon > 0$, increasing c_f to $c_f + \epsilon$ reduces average task importance, when c_f is relatively low. The intuition is as follows.

As discussed above, decision-makers experience an overall welfare loss occurs if and only if $p \in (0, 1)$, i.e., task suppliers utilise both urgent and non-urgent frames in equilibrium. This is equivalent to saying that maximum average task importance is attained whenever either $p = 1$ or $p = 0$. Observe that, by proposition 1, $p = 1$ whenever $c_f \geq 1 - \beta$, and $p = 0$ whenever $c_f = 0$. Hence, when $p = 1$, all offered tasks are non-urgent, and the average importance of non-urgent tasks coincides with that of the benchmark case, i.e., $\mathbb{E}_{\sigma^H}[x|u = 0; \beta, c_f] = \mathbb{E}^*_{\sigma^H}$. Observe that increasing the framing cost from this point does not have any effect on the equilibrium and, thus, results in maximum average task importance being preserved.

In contrast, when $p = 0$, all offered tasks are urgent, and the average importance of urgent tasks coincides with that of the benchmark case, i.e., $\mathbb{E}_{\sigma^H}[x|u = 1; \beta, c_f] = \mathbb{E}^*_{\sigma^H}$. However, notice that increasing the framing cost *does have* an impact on the equilibrium by, on the one hand, reducing the incentives to offer urgent tasks and, on the other hand, increasing the incentives to offer non-urgent tasks. Given the structure of the support of F_0 and F_1 discussed above, this in turn implies that $\mathbb{E}_{\sigma^H}[x|u = 0; \beta, c_f]$ increases and $\mathbb{E}_{\sigma^H}[x|u = 1; \beta, c_f]$ decreases. Since average task importance $\mathbb{E}_{\sigma^H}[x; \beta, c_f]$ is a weighted average of the two (see Eq. 7), then the net effect is a reduction of overall welfare. Average task importance attains its minimum at $c_f = \frac{1-\beta}{2}$, which is the point at which the supports of F_0 and F_1 coincide. Then, for values of c_f larger than $\frac{1-\beta}{2}$, increasing c_f results in an increase of average task importance. Figure 2 displays equilibrium average task importance as a function of the parameters of the model for a specific task-importance cost functional form.

As it can be seen from Fig. 2, making BR decision-makers more rational by increasing c_f is effective at increasing the average level of task importance, only if BR decision-makers are not too boundedly rational $\left(c_f \geq \frac{1-\beta}{2}\right)$. In contrast, when BR decision-makers' degree of rationality is relatively low $\left(c_f < \frac{1-\beta}{2}\right)$, educating BR decision-makers by increasing c_f surprisingly makes them worse off.

6.2 Auditing

As discussed in the introduction, it is common for public authorities to open investigations on online firms that adopt practices aimed at pressuring consumers, and to take actions against them. The purpose of this subsection is to investigate the effects of this kind of auditing policies in the context of the proposed model.

Suppose that with probability $\rho \in [0, 1]$ an authority audits supplier i. Conditional on supplier i being audited, the authority imposes a fine τ in the realisation in which supplier i frames their tasks urgent. In order to ensure that, in the state of the world in which a supplier is audited, choosing (x, u) with $u = 1$ is a strictly dominated strategy, I assume that $\tau > 1$.

Letting $\pi_i(\cdot)$ denote the original supplier i's payoff function (eq. 1), the resulting supplier i's extended payoff function—denoted π_i^{Aud}—is defined as follows.

$$\pi_i^{Aud}((x_i, u_i), (x_j, u_j)) := \begin{cases} \pi_i(\cdot), & \text{if } u_i = 0 \\ \pi_i(\cdot) - \rho \cdot \tau, & \text{if } u_i = 1. \end{cases} \tag{9}$$

Observe that the above payoff function encompasses the model of section 3 as a special case, in that $\pi_i^{Aud}(\cdot) = \pi_i(\cdot)$ if and only if the expected fine $\rho \cdot \tau = 0$, or, equivalently, $\rho = 0$. The next proposition fully characterises the effects of the auditing policy.

Proposition 3 (Auditing) *Let σ^{Aud} denote the unique symmetric equilibrium strategy resulting from suppliers being endowed with the payoff function of Eq. 9.*[16] *Then, σ^{Aud} satisfies the following properties.*

i *There exists a threshold $\overline{c_f} := \max\left\{0, \frac{1-\beta-\rho\cdot\tau}{2}\right\}$ such that:*

  a *for all $c_f \geq \overline{c_f}$, there holds*

$$\mathbb{E}_{\sigma^{Aud}}[x; \beta, c_f, \tau, \rho > 0] \geq \mathbb{E}_{\sigma^{Aud}}[x; \beta, c_f, \tau, \rho = 0]$$

  b *for all $c_f < \overline{c_f}$, there holds*

$$\mathbb{E}_{\sigma^{Aud}}[x; \beta, c_f, \tau, \rho > 0] < \mathbb{E}_{\sigma^{Aud}}[x; \beta, c_f, \tau, \rho = 0]$$

ii *There exists a threshold $\overline{\rho\cdot\tau} := \frac{1-\beta}{2}$ such that, for all $\rho\cdot\tau \geq \overline{\rho\cdot\tau}$, $\mathbb{E}_{\sigma^{Aud}}[x; \beta, c_f, \tau, \rho]$ is non-decreasing in c_f.*

The main message of proposition 3 is three-fold. First, adopting the auditing policy (weakly) increases average task importance, only if the framing cost c_f is larger than, or equal to, a threshold $\overline{c_f}$ (case i.a). Observe that the threshold $\overline{c_f}$ is decreasing in

[16] The characterisation of the unique symmetric equilibrium strategy σ^{Aud} can be found in the supplement.

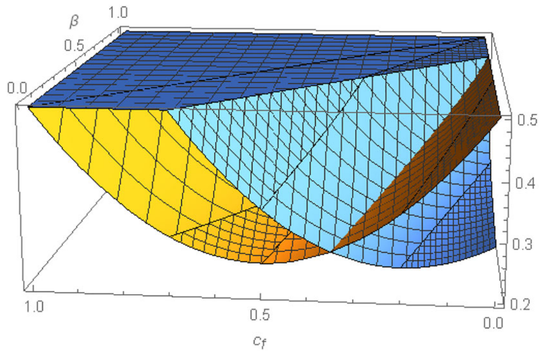

Fig. 3 $\mathbb{E}_{\sigma^{Aud}}[x; \beta, c_f, \rho, \tau]$ as a function of the parameters β and c_f, when $\rho \cdot \tau = 0$ (yellow) and when $\rho \cdot \tau = 0.3$ (blue); linear task-importance cost function

the expected fine $\rho \cdot \tau$. It follows that, if the expected fine $\rho \cdot \tau$ is sufficiently large, then the threshold $\overline{c_f}$ equals to zero. In this case, condition (i.a) of proposition 3 is always satisfied, which implies that implementing the auditing policy produces higher equilibrium average task importance than not implementing it.

Second, if the framing cost c_f is smaller than the threshold $\overline{c_f}$, then implementing the auditing policy has detrimental effects (case i.b). The reason is as follows. Recall that (coroll. 2), when no policies are implemented, average task importance is maximised if and only if task suppliers do not mix between frames, by choosing either $u = 0$ or $u = 1$ with certainty. Suppose that the auditing policy is implemented and consider the cases in which c_f is in the vicinity of 0. Observe that when the expected fine is not high enough, but it is positive, task suppliers have lower incentives to frame their tasks urgent and higher incentives to framed them non-urgent. This—in turn—results in more mixing between frames than there would have been, had the auditing policy not being implemented. This produces a higher urgency effect, and consequently a reduction in average task importance.

These results imply that, not only—as discussed in Sect. 6.1—the policy of educating BR decision-makers, but also the auditing policy are effective, only if the degree of rationality of BR decision-makers–measured by the framing cost—is sufficiently high. Figure 3 displays equilibrium average task importance with and without the auditing policy being implemented, as a function of the parameters of the model for a specific task-importance cost functional form.

Third, proposition 2 and proposition 3(i) indicate that both the educating BR-agent policy and the auditing policy present shortcomings. Prop. 3(ii) pins down the conditions under which a combination of the two policies always produces positive effects. Specifically, assume that for some reason the expected fine cannot be set so that the threshold $\overline{c_f}$ is equal to zero. One such instance could be that it is too costly for the policy-maker to audit with a probability ρ that is too high. Then, in that case there exists a smaller expected-fine threshold $\overline{\rho \cdot \tau}$ such that, for any expected fine $\rho \cdot \tau$ larger than, or equal to, $\overline{\rho \cdot \tau}$, educating BR decision-makers by increasing c_f increases average task importance.

7 Conclusions

To the best of my knowledge, this is the first paper that studies the implications of the urgency effect in a competitive setting. From a game-theoretic point of view, the proposed model is a multi-effort contest, whose contest success function can be written as a convex combination of a standard all-pay auction and a 'lexicographic' contest success function, and that includes a standard all-pay auction as a special case. The economic message of this paper is three-fold.

First, the paper provides testable implications of Eisenhower's quote that gives the title of the paper, by showing that '*what is important is seldom urgent and what is urgent is seldom important*', i.e., there is a negative equilibrium correlation between perceived task urgency and task importance if, and only if, the framing cost is sufficiently high relative to the amount of bounded rationality in the decision-makers population. Furthermore, it shows that the importance-urgency correlation implied by Eisenhower's quote shall not to be used to make welfare inferences, in the sense that when in a competitive setting most tasks are framed as urgent, it is not necessarily the case that welfare losses are more likely to occur.

Second, the paper shows that the urgency effect *can* induce a reduction in decision-makers' overall welfare, measured as the average equilibrium task importance. Specifically, for extreme values of the framing cost, task suppliers frame all their tasks as either urgent or non-urgent with certainty, which results in maximum welfare. In contrast, for intermediate values of the framing cost, task suppliers have an incentive to mix between urgent and non-urgent frames, which results in the urgency effect being triggered. In turn, thanks to the urgency effect, task suppliers can afford to reduce the importance of the offered tasks in equilibrium - thus leading to an overall reduction in welfare—because BR decision-makers subject to the urgency effect resolve any importance-urgency tradeoff in the wrong way, by choosing the dominated tasks. These results indicate that the source of the welfare loss is given by the fact that task suppliers mix between urgent and non-urgent frames—thus by creating *spurious task differentiation*—with the property that more mixing between frames leads to larger welfare losses.

Third, the paper studies the effects of several policies aimed at correcting the identified failure, such as educating BR decision-makers and auditing. Interestingly, it is shown that such policies are effective, only if BR decision-makers are not too boundedly rational. In particular, when BR decision-makers' degree of rationality is sufficiently small, educating BR decision-makers by making them more similar to FR decision-makers has the undesired effect of reducing average equilibrium importance, thus inducing a welfare loss. A similar effect occurs when the auditing policy is implemented: when BR decision-makers are too boundedly rational, implementing the auditing policy induces more mixing between frames than there would have been, had the policy not being implemented, which results in a higher welfare loss. A corollary to these results is that, unlike one is led to think, when the framing cost is sufficiently low, intervening by implementing corrective policies is detrimental. The paper concludes by showing how a combination of the two policies always produces positive welfare effects.

I now turn to the discussion of the model's limitations and potential extensions. First, for simplicity, the proposed model assumes that perceived urgency is a binary variable. One possible extension of the model is to assume multiple (more than two) levels of urgency. The challenge in pursuing this extension is two-fold. First, it naturally makes the equilibrium analysis more demanding. Second, since the urgency experiments discussed in the introduction also feature perceived urgency as a binary variable, it would not be clear how to model the urgency effect when multiple levels of perceived urgency are allowed (how are tradeoffs between a very urgent less-important tasks and moderately urgent more-important tasks resolved?), nor to provide a behavioural justification for it. As such, it would be interesting to run a follow-up experiment that is identical to Zhu et al (2018)'s, except that the perceived level of urgency can have more than two levels. The experimental results would then be useful to better inform the modelling assumptions that such extension would underlie.

Second, the task importance cost function and the task urgency cost function are additively separable. This assumption is plausible for certain situations, such as when task suppliers have separate divisions aimed at setting up the importance level x and the urgency framing u of the offered task (x, u). If task suppliers are interpreted as firms, the divisions under consideration could be the production department and the marketing department, respectively, that are working independently. However, there are other circumstances in which this assumption is less likely to be valid. If I am a lobbyist and spend a big part of the day framing my task as urgent (thus incurring c_f), then I will be very tired when I eventually get around to choosing x, which will make that activity harder and costlier. Therefore, a relevant extension that embeds this complementarity would feature a cost function $g(x, u)$ that has increasing differences in (x, u), i.e., for all $x \geq x'$ and all $u \geq u'$, there holds $g(x, u) - g(x, u') \geq g(x', u) - g(x', u')$. Interestingly, it can be shown that, for a class of such increasing-differences cost functions, the resulting equilibrium would be qualitatively the same as that characterised in this paper, indicating that the results of this paper are robust to more general cost structures.[17]

Third, as discussed in the introduction, there are real-world situations in which urgency framing is likely to be used, and competitors exert costly effort to manipulate the *perceived* urgency of the offered tasks (e.g. lobbying). On the other hand, there are also real-world situations in which task urgency is genuine, in the sense that failing to complete an urgent task on time leads to negative payoff consequences (e.g. failing to pay a fine by the deadline). Building on the well-documented urgency effect, this paper studies (and is relevant for) the first class of situations, by investigating the strategic use of urgency frames in a competitive setting when urgency is *spurious*. So extensions dealing with the second class of cases would bring the resulting model outside the domain of urgency framing experiments. With that said, an extension that would be interesting to analyse *independently* is to consider a two-period model, in which in period 1 task suppliers simultaneously decide the importance and urgency of

[17] For example, assume that the cost function is defined as follows: $g(x, u) := c(x) \cdot d(u) + c(x) + d(u)$, where $c(\cdot)$ and $d(\cdot)$ are defined as in the model section, so that g is not additively separable across task dimensions and has *strictly* increasing differences in (x, u). It turns out that, like the symmetric equilibrium of proposition 1, the symmetric equilibrium of the resulting model has the property that task suppliers mix between urgency frames if and only if $c_f \in (0, 1 - \beta)$.

the offered task, with the property that—unlike in this paper—failing to undertake an urgent task in period 1 *does have* direct payoff-relevant consequences. Subsequently, upon observing the tasks offered by task suppliers, decision-makers decide which task to carry out first (in period 1) and which task to carry out last (in period 2), with the property that both task suppliers and decision-makers discount period-2 payoffs (if any) by a discount factor δ. This is left for future research.

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Declarations

Conflict of interest The author has no conflicts of interest.

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