

# A Critique of Hausman's Interpretation of Revealed Preference Theory

Nicolas Berneman, EIPE-EUR & CIECE-FCE-UBA  
[nicolas.berneman@gmail.com](mailto:nicolas.berneman@gmail.com)

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**Abstract:** The main purpose of the essay is to criticize Hausman's characterization of the economic notion of preference, which he referred to as "preference\*". My main objection is that it is misleading to define preference\* according to only two elements: preference and belief. Instead, I will argue that even if we were able to assume belief as given, choices would still not reveal preference. Therefore, although it might be true that both belief and preferences are necessary for choices, I will argue that they are not sufficient as conditions. First, I will argue that efficacy should also be included as another element of the set preferences\*. Then I will propose that, even if including efficacy, it could be misguided to conclude that we have reached a complete definition of preference\*. Finally, I will suggest that there could exist a misunderstanding around the notion of belief.

**Keywords:** Revealed Preference Theory, Hausman, Belief, Preference, Efficacy.

**Resumen:** Este trabajo tiene por objetivo principal criticar la caracterización de la noción económica de preferencia realizada por Hausman, la cuál denomina "preferencia\*". Mi principal objeción es que es equivocado definir preferencia\* como un conjunto que contiene sólo dos elementos: preferencia y creencia. Contrario a eso, voy a argumentar que incluso en el caso que pudiésemos asumir las creencias cómo dadas, las elecciones aún no revelarían las preferencias. Por lo tanto, aunque puede ser cierto que tanto creencia como preferencia son elementos necesarios en las elecciones, voy a argumentar que no son suficientes. Primero, voy a exponer que la eficacia también deber ser incluida como otro elemento del conjunto preferencias\*. Segundo, voy a proponer que incluso agregando eficacia podría ser erróneo concluir que hemos alcanzado una caracterización completa de preferencia\*. Finalmente, sugeriré que puede estar habiendo un malentendido acerca de la noción de creencia.

**Palabras claves:** Teoría de la Preferencia Revelada, Hausman, Creencia, Preferencia, Eficacia.

## Introduction

Daniel Hausman (2000) claims that the notion of “revealed preference” is unclear and should be abandoned. The revelation theorem holds that if  $C(s)$  is the set of alternatives the agent chooses from  $s$ , and  $R$  is the weak preference relation, then choices reveal preferences. For instance, if  $s=\{a,b\}$  and an agent chooses  $a$  ( $C(a)$ ), then the revelation theorem holds that the agents prefer  $a$  over  $b$  ( $aRb$ ). Against the revelation theorem Hausman argues that it is not true that choices reveal preferences.

Hausman's main objection to this theorem is to reject the interpretation of  $R$  as weak subjective preference. He argues that what economists call preference is a technical concept (which he terms “preference<sup>\*</sup>”) that differs from the actual (psychological meaning of) preference. However, he suggests that preference<sup>\*</sup> does also include this folk psychology notion of preference though not exclusively. According to Hausman, preference<sup>\*</sup> entails both preference and belief. Therefore, he claims that “within folk psychology, one cannot infer preferences from choices alone, because choices depend on both belief and preference [...]” and therefore “it is only preference (not preferences<sup>\*</sup>) that combines with belief to determine choice” (Hausman 2000, 103/6). Using symbolic notation, Hausman claims that  $C(s)$  cannot reveal preferences because  $R$  does not mean  $p$  (folk psychology notion of preference) but  $P^*$  (economics technical notion of preference) where  $P^* = \{p, b\}$ , and  $b$  means belief.

In the essay, I will critically analyze Hausman's concepts of preference and preference<sup>\*</sup>. In particular, I will discuss Hausman characterization of  $P^*$ . I will argue that even if we assume belief as a given, choices may still not reveal preference. For instance, it would be possible to have both belief and preference for a specific choice but not be “efficacious” in achieving it (Davidson, 1974, p. 232). In that sense, we will claim that preference and belief are not enough to characterize preference<sup>\*</sup>, but rather *efficacy* should be included as well. Moreover, given the difficulty of finding the necessary and sufficient conditions to connect reason and action, I will suggest that it may not be possible to reach a full characterization of preference<sup>\*</sup> in folk psychology terms.

## Hausman: Preference vs. Preference<sup>\*</sup>

Hausman (2000) argues that “revealed preference” theory is unclear and should be abandoned because it is based on a misleading interpretation of

the revelation theorem. As we have mentioned, revealed preference theory establishes that it is possible to uncover agents' preferences by observing their choices. In this sense, revealed preference has been a significant advance within economics since it has made it possible for economists to dispense with the folk psychology notion of preference. Instead of referring to unobservable mental entities, economics could proceed on the basis of observable choices.

In this framework, the central criticism of Hausman is with regard to the economic interpretation of R. Since R is usually taken as a weak (subjective) preference, Hausman focuses his objection on the way that economists understand the notion of preference. Although Hausman claims that choices do not reveal preference but preference\* -an economical technical concept-, he argues that as soon as economists refer to utility and subject probabilities, preference\* cannot be completely detached from the folk psychology conception of preference. Therefore, whatever preference\* unerringly means, it must contain the notion of preference.

“Those economists who want to explain or predict preferences\* in terms of agents' utilities and subjective probability judgments cannot dispense with the notion of preference. For it is only preference (not preference\*) that combines with belief to determine choice. Furthermore, if one eschews all talk of preference (or psychological cognates such as desire), then claims about beliefs or subjective probabilities are untestable and consequently scientifically illegitimate.” (Hausman 2000, 106)

Hence, Hausman's main claim is precisely that choices cannot reveal preference because choices depend on both preference and belief. For example, to explain why an investor purchases one stock rather than another, we need to know not just her preferences (larger returns), but also her beliefs (returns A will be higher than returns B). Indeed, the same preferences with other sets of belief could lead to a different choice. Pushed to the extreme, *given the right set of beliefs, any set of choices is consistent with any set of preferences*. Consequently, it is evident that one cannot infer preferences from choices without premises concerning beliefs. Following with the symbolic notation, Hausman criticizes that C(s) does not reveal P (folk psychology notion of preference) but P\* (economics technical notion of preference) where  $P^* = \{p, b\}$ . Hence, since C(s) is the only source of evidence, we are not able to infer which combination of p & b led to it.

An important implication of Hausman's argumentation is that if we were able to know the agent's belief, then their choices would effectively reveal preferences. Basically, it is because preference\* contains only two elements: preference and belief. Therefore, if choices reveals preference\*, by assuming

we know either preference or belief we are able to infer one from the other.<sup>1</sup> In this sense, Hausman agrees that choices reveal preferences in the cases where beliefs are taken as given -- or reveal beliefs in the cases where we know the agents' preference. Consequently, Hausman's objection in these circumstances is that they are not the relevant class of revelation in economics:

"If one takes beliefs as given, there is relatively little difficulty in taking choice to "reveal" preference. But this fact is of no comfort to the revealed-preference theorist, because this is not the relevant sort of revelation. This revelation is uncontroversial and fully consistent with folk psychology. It does not support the claim that choice defines preference." (Hausman 2000, 104)

This paragraph confirms Hausman's characterization of Preference\* as preference and belief ( $P^* = \{p, b\}$ ). This is precisely the account that I will criticize in the following section.

### **Preference\* is More than Preference and Belief**

In this section I will develop the main criticism to Hausman's characterization of preference\*, which is that it is misleading to characterize preference\* according to only two elements. In order to demonstrate that even if we were able to assume beliefs as a given, choices would still not reveal preferences, we will take the example of the investor who is deciding which stock ( $s_a$  or  $s_b$ ) to buy.

Suppose that  $s_a$  is composed of diversified agricultural ETFs that invest in soybeans while option  $s_b$  is a US mutual fund. Let's also assume that both  $s_a$  and  $s_b$  share the same level of uncertainty (or risk). We will maintain, then, that it could be the case that an investor who believe that  $R^e(\text{soybeans}) > R^e(\text{mutual funds})$  and who prefers larger returns, ends up nevertheless buying *mutual funds*. For these cases, where the choices do not reflect preference and belief, we maintain that beliefs and preferences were not *efficacious* in causing the choice. For instance, it could be the case that the investor actually had the intention to buy the *soybeans* but failed simply because of some (their own, third-party, or system) mistake and therefore she finally finished buying *mutual funds*. Also, it could be the case that, although during reflection the investor decided to buy the *soybeans*, but at the moment to make a choice an emotion – rather than deliberation – drove

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<sup>1</sup> It can be easily seen through our symbolic notation. Since  $C(s)$  does not reveal  $P$  but  $P^*$ , where  $P^* = \{p, b\}$ ; if  $b$  were fixed, then we could infer  $p$  from  $P^*$ .  $[C(s) \xrightarrow{rvl} P^* \xrightarrow{\bar{b}} p]$ .

her behavior.<sup>2</sup> Both cases – mistakes and emotions – seem to be relevant; however, for the purposes of the essay, I will interpret both of them as instantiations of efficacy problems.

We might think that preference and belief generate an *intention* to make a choice, and then the *efficacy* is needed in order to finally perform it. In this sense, efficacy would connect intentions with actions. So defined, efficacy would contain different reasons why choice is not only the consequence of the preference and belief – last paragraph we have referred to mistakes and emotions. Whatever, it is enough to show that Hausman's characterization of preference\* is misleading. In both of the cases that we have mentioned, if we had known the investor's belief  $-R^e(\textit{soybeans}) > R^e(\textit{mutual funds})-$  and had observed her choice  $-mutual funds-$ , we would erroneously infer that the investor prefers lower returns.<sup>3</sup>

What follows from the examples is that it is not true that knowing belief allows choices to reveal preferences, nor does knowing preference imply that choices reveal belief. The reason is simple: Preference\* - or what choices reveal - cannot be reduced to preference and belief. Following this argumentation, at minimum, we must include efficacy. Following with symbolic notation, we have claimed that it is misguided to define  $P^* = \{p, b\}$ ; instead, we propose to characterize it as  $P^*/ P^* = \{p, b, e, \dots\}$  where the new element E means efficacy.<sup>4</sup>

Davidson (1974) also remarks on the difficulty in defining a clear causal connection from desire and belief with actions; indeed, going further, he states that it is extremely difficult (if at all possible) to define the necessary and sufficient conditions for actions.

“A desire and a belief of the right sort may explain an action, but not necessarily. A man might have good reasons for killing his father, and he might do it, and yet the reasons not be his reasons in doing it (think of Oedipus). So when we offer the fact of the desire and belief in explanation, we imply not only that the agent had the desire and belief, but that they were *efficacious* in producing the action. [...] Can we somehow give conditions that are not only necessary, but also sufficient, for an action to be intentional, using only such concepts as those of belief, desire and cause? I think not.” (Davidson

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<sup>2</sup> “Neuroscience strongly suggests that often emotion (or affect) rather than deliberation (or “cool cognition”) is primary in driving behavior.” (Vromen, 2011, p. 269)

<sup>3</sup> The same mistake would be made if, by knowing investor's preference for larger returns and observing her choice of *mutual bonds*, we would infer the investor's belief as  $R^e(\textit{soybeans}) < R^e(\textit{mutual funds})$ .

<sup>4</sup> An important clarification: it is misguided to characterize preference\* as a combination of preference and belief as long as we intend to interpret (at least one of) these elements in terms of folk psychology. As we have seen, Hausman states that it would be flawed not to refer to preference at all. Therefore, I am assuming that at least one of the elements inside preference must refer to folk psychology notion of preference.

1974, 232. Italics in original).

Accordingly, our objection does not mean that by adding efficacy, we have reached a complete characterization of preference\*. We have just established that belief and preference are not sufficient elements. Furthermore, we suggest that, as long as preference\* includes an element from folk psychology, it would be sincerely problematic to characterize preference\* as a closed set. Therefore, we have showed that Hausman's description of preference\* -- as a closed set of belief and preference -- is mistaken, and should be abandoned.

### On the Definition of Belief

A possible refutation of our criticism would be to argue that there is a problem in what we define as investor's belief. In fact, if the investor actually has believed that -- given the same level of uncertainty --  $R^e(s_a) > R^e(s_b)$  and she had also preferred larger returns, then she would have chosen  $s_a$ . Hence, if preferring larger returns she chose  $s_b$ , it was because her belief was not  $R^e(s_a) > R^e(s_b)$  but  $R^e(s_a) < R^e(s_b)$ . From this perspective, what we call a mistake is not actually a mistake, but it is a way to show the true belief of the investor. In the same way, when we make reference to emotion interfering in the investor's choice, it could also hold that emotions indeed reveal authentic belief as well.<sup>5</sup>

If it were the answer, then we could argue that there is a problem with the meaning of belief. Throughout his work, Hausman refers to beliefs as subjective probabilities. But if Hausman would now claim that preferring larger returns and choosing  $A$  means that the *true* belief is  $R^e(s_a) > R^e(s_b)$ , then we should conclude that (1) subjective probabilities do not necessarily reflect the agent's beliefs and (2) it is not possible to identify agent's beliefs before observing her choices. Consequently, if it were the case, we would not be able to assume belief as given; hence, there would be no place for choices to reveal preferences because both belief and preferences could just be inferred after observing choices -- *a posteriori*.

Different interpretations of preference\* have thus emerged. On the one hand, we could maintain that subjective probabilities are a good

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<sup>5</sup> In the same way, it could be claimed that if believing  $R^e(s_a) > R^e(s_b)$  she chose  $s_b$ , it was not true that the investor authentically preferred larger returns. If it were the case, then we should discuss how to understand preference. Nevertheless, as we have settled that we understand preference not as mere residue of choices but as a mental state in psychology terms, along this section we will assume that we truly know that the investor actually prefer larger returns, and thus we will focus on the problem of how to understand belief.

understanding of an agent's belief, and therefore incorporate efficacy as a new element of preference\*. Hence, in symbolic notation, the first possibility is to characterize preference\* such  $P^* = \{p, b, e, \dots\}$ , where  $b$  can be understood as subjective probabilities ( $sp$ ). On the other hand, we could say that it is correct to characterize preference\* as preference and belief, but imprecise to describe beliefs as subjective probabilities. In this second case, we could consider efficacy as somehow forming part of belief. Thus, the second option would be to describe  $P^*/P^* = \{p, B\}$  where  $B$  includes subjective probabilities, efficacy and so on ( $B = \{sp, e, \dots\}$ ).

Of course these cases are not exclusive, so we could also consider a third interpretation of preference\* which include efficacy as a new element and belief as different of subject probability. For instance, some behavioral economists like Kahneman & Tversky (1979) suggest that when making decisions, rather than subjective probabilities, individuals actually take into account decision weights. This distinction seems to be relevant at least in two sense: first, decision weights not always reflects perceived subjective probability; second, decision weights are just inferred from chooses and thus there is not place to take them as given independently from chooses. Indeed, avoiding the conceptual problems that accompany folk psychology terms, the authors argue that decision weights should not be interpreted in terms of belief.<sup>6</sup> Hence, the third option would be to characterize  $P^*/P^* = \{p, b, e, \dots\}$  where  $b$  may differ from subject probability but does not include  $E$ .

Consequently, we have characterized preference\* in three different ways: (1)  $P^* = \{p, b, e, \dots\}$ , where  $b = sp$ ; (2)  $P^* = \{p, B\}$  with  $B = \{sp, e, \dots\}$ ; and (3)  $P^* = \{p, b, e, \dots\}$ , where  $b \neq sp$ . All of them substantially differ from Hausman's account. However, since belief might not necessarily be described as subject probability (Kahneman & Tversky 1979, Weber 1994) first option is unconvincing. Similarly, since it is farfetched to include efficacy as part of agents' beliefs, second alternative is rather implausible. Consequently, we suggest the third interpretation -which includes efficacy as a new element of an open set and does not conceive belief as equivalent to subject probability- as the most reasonable one.

## Conclusion

We have analyzed Hausman's interpretation of "revealed preference" theorem. In particular, we have discussed his characterization of preference\*

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<sup>6</sup> "Decision weights are inferred from choices between prospects much as subjective probabilities are inferred from preferences in the Ramsey-Savage approach. However, decision weights are not probabilities: they do not obey the probability axioms and they should not be interpreted as measures of degree or belief." (Kahneman & Tversky 1979, 280)

as a combination of only belief and preference. First, we have shown that even if we assumed belief as a given, choice may still not reveal preference (nor when assuming preference as a given does choice reveal beliefs). Secondly, we have argued that efficacy is also required as another element to describe preference\*. Third, we have suggested it is still extremely difficult (if at all possible) to find conditions sufficient to characterize preference\* with folk psychology terms.

Finally, we have considered a possible response to our criticism. In doing so, we have considered that there is a problem with the definition of belief. We have pointed out that as long as we consider that, given belief, choice reveals preference, then we should conclude that belief may contain not just subjective probabilities but also efficacy. Instead, if we understand belief as subjective probabilities – as Hausman does – then we should include efficiency as a new element of preference\*. However, we could include efficacy as a new element of preference\* even when we consider that belief may differ from subjective probability. Last option emerges as the most plausible one.

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