How much is your time worth?

Salaries show how much people want for the time they spend working, but how do they value their time doing other things outside work? **Christian Krekel** *and* **George MacKerron** *analyse more than two million data points from a smartphone app that randomly asks people how they feel at any particular moment and what they are currently doing, to provide estimates of the value of time in 42 daily activities.*

Few other things are as important to people's lives as how they spend their time. The use of their time significantly determines how happy people are from moment to moment, and it is a significant predictor of their overall satisfaction with life.

Public policy has long been interested in putting a price tag onto time use. While there is an obvious price of labour – the hourly wage rate, determined in competitive labour markets – many other uses of people's time are not traded on markets, yet are equally important for social welfare. For example, during their leisure time, people are involved in "household production", running errands or doing household chores, helping or caring for their children or other family members. They also spend time volunteering, engaging in culture and the arts, or spending time outside in nature.

How can policymakers value time spent in such activities, for example in social cost-benefit analyses to justify investments into relevant infrastructure, or in national accounts to paint a clearer picture of social welfare overall?

Economists have tried to estimate the value of time (VOT) since the 1960s, starting with seminal work by Gary Becker, who made the theoretical argument that both market goods and time are inputs into household production, and that a time budget is split between labour and leisure such that time spent in "leisure" – a broad category that can include many different activities – is optimally valued at the prevailing wage rate. Other economists have since expanded this line of thinking, introducing refinements such as disutility caused by work itself, constraints to time allocation, or joint household production.

Empirically, economists have tried to estimate the VOT either by directly asking people how much they would be willing to pay for, say, one hour spent in a certain activity ([so-called *stated preferences*](#)) or by inferring their willingness to pay from [observing their behaviour](#) (so-called *revealed preferences*), for example by recording their [willingness to wait longer](#) for a cheaper ride share when estimating the VOT for commuting. But people have been shown to [make systematic errors](#) when predicting the welfare consequences of their choices, such as when trading off time with money. Most importantly, what constitutes a particular use of people's time is entirely subjective. For example, time spent waiting with a loved one may be experienced very differently than time spent waiting alone or may not be perceived as waiting at all. What then?

In [our latest study](#), we propose an alternative method to estimate the VOT: to exploit people's feelings – their "hedonic experiences" – in real-time, an approach we call *experiential valuation*. Our method does not rely on what people think the welfare consequences of their choices will be but, instead, on how they actually feel once they have made their choices. Most importantly, it allows people to judge for themselves what constitutes a particular use of their time, in line with the notion of subjective time perception and the importance of context in which an activity is experienced.

We are the first to exploit people's hedonic experiences in real-time to value time (or indeed anything). However, the basic idea behind this approach is old, going back to the early economist Francis Y. Edgeworth (1845-1926), who argued that, at some point in the future, a psychophysical machine – a so-called *hedonimeter* – would make it possible to directly measure utility on a physiological basis. Like many of his contemporaries, Edgeworth was rather pragmatic when it came to potential imperfections of this instrument, arguing that the "greater uncertainty of hedonimetry […] may be compensated by the greater number of measurements, a wider average; just as, according to the theory of probabilities, greater accuracy may be attained by more numerous observations with a less perfect instrument".

Drawing on Edgeworth's vision, our method allows us to estimate the VOT in 42 daily activities (as well as their interactions), without being confined to broad categories such as 'labour' or 'leisure', or singular activities such as commuting. This allows us to paint a complete picture of people's time use, which provides monetary estimates that can then be used by policymakers in social cost-benefit analyses and national accounting.

The value of time in 42 daily activities

We use a smartphone app that during the years 2010 to 2017 randomly asked a panel of 30,936 UK residents (yielding 2,235,733 unique observations) about their momentary feelings and activities as they went about their lives. We exploit these longitudinal data to estimate the VOT for their daily activities. Our regressions look at within-individual variation, controlling for other activities respondents may be simultaneously engaged in (if they are multi-tasking), where they currently are, who they are with, weather conditions, and region and time fixed effects.

We obtain the VOT for each activity in three steps:

1. First, we estimate the effect of each activity and income on respondents' happiness.
2. Then, we calculate the marginal rate of substitution between each activity and income to obtain the monetary equivalent of each activity, evaluated at the median household income in the UK and standardised to £ per 60 minutes.
3. Finally, we obtain the VOT for each activity by subtracting from the monetary equivalent of that activity the weighted average of the monetary equivalents of all the other activities (that is, the counterfactual).

Table 1 shows the VOT for selected daily activities (for the list of all 42 daily activities as well as their interactions see tables 2 and 3 in our discussion paper).

Table 1. Value of time (VOT) (£, 60 minutes) for selected activities

Activity	VOT
Waiting, queueing	£ -12.2
Waiting, queueing during commuting, travelling	£ -17.2
Commuting, travelling	£ -8.4
…	
Working, studying	£ -8.4
Housework, chores	£ -5.0
Care of adults	£ -12.6
Childcare	£ -6.9
…	
Sports, running, exercise	£ 11.7

Theatre, dance, concert	£ 11.2
Exhibition, museum, library	£ 8.1
…	…
Being sick in bed	£ -46.4

On average, spending 60 minutes waiting, as opposed to doing something else, is worth £ -12.20. The negative sign points towards an opportunity cost: people would be better off – in terms of their momentary happiness – doing something else. In particular, spending 60 minutes waiting during commuting can be valued at £ -17.20. That is, a person who is stuck in traffic would need to be compensated £ 17.20 to achieve the same happiness level as a person who is not. This estimate can readily be used in social cost-benefit analyses of infrastructure projects aimed at reducing waiting time during commuting or travelling (for example, the Elizabeth Line or HS2). As it turns out, it closely resembles estimates from studies using revealed preferences, which suggests that using hedonic experiences may lead to similar results as observed behaviour when estimating the VOT for commuting. One hour of commuting itself can be valued at £ -8.40.

When it comes to work both outside and inside the household, we find that spending 60 minutes working or studying is worth £ -8.40, spending 60 minutes doing housework or chores is worth £ -5.00, and caring or helping adults is worth £ -12.60 while childcare can be valued at £ -6.90. These estimates can be used in national accounts to capture important non-market household production tasks that would otherwise be left unaccounted for.

Better ways of spending one's time are sport and cultural activities. We find that spending 60 minutes doing sports, running, or exercise is worth £11.70; going to the theatre, dancing, or a concert £11.20; and visiting an exhibition, museum, or library £8.10. Such monetary values may be of high relevance to UK Government departments and agencies such as the Department for Digital, Culture, Media and Sport; Historic England; or Sport England.

Since 2021, HM Treasury's Green Book – the official guideline for policy analysis in the UK – allows government analysts to use individuals' self-reported life satisfaction (so-

called _[Wellbeing-Adjusted Life Years or WELLBYs](#)_) as a measure of benefit in policy appraisal and evaluation. But WELLBYs are often too coarse to capture short-term, one-off activities people may engage in during leisure.

Our method shows how individuals' hedonic experiences in real-time can be used as a complement, which may be particularly useful for activities that are too granular to be captured by global life evaluations but that are nevertheless important for social cost-benefit analysis or national accounting, for example not being stuck in traffic or important aspects of household production such as caring or helping other family members and children. A promising avenue to capture such activities may, therefore, be to devise a complement measure based on people's feelings, such as a _Wellbeing-Adjusted Life Hours_ or _WELLBHs_.

Few things matter as much for people's happiness and life satisfaction as how they spend their time. Valuing their hedonic experiences in real-time – so-called _experiential valuation_ – can help put a price tag onto a wide range of different uses of their time, thereby making them relevant for public policy. It has the potential to value other intangibles too.

- _This blog post is based on the authors' paper [Back to Edgeworth? Estimating the Value of Time Using Hedonic Experiences. CEP Discussion Paper 1932](#)._
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