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► **To cite this version:**

François Moreau. Accounting for Free Digital Cultural Goods in the GDP of the Economy of Culture and Creative Industries: Methodological Considerations. *Revista Observatório*, 2023, 34, pp.36-42. 10.53343/100521.34 . hal-04570596

HAL Id: hal-04570596

<https://hal.science/hal-04570596v1>

Submitted on 7 May 2024

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Accounting for free digital cultural goods in GDP: methodological considerations

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Abstract. *Because they come at zero monetary cost for consumers, and despite their growing importance, digital cultural and creative goods and services are very poorly taken into account in national account statistics, and especially in GDP statistics. This paper reviews methodological approaches which could allow policy makers and economists to overcome this drawback with cheap and easy tools focusing on the benefits yielded from free digital goods and services.*

The 1980s and 1990s were marked by “the culmination of interest in the economic contribution of culture and cultural industries and new approaches for understanding the relationship between culture and economic development” (UNESCO, 2009). Since the first decade of 21st century, there is growing appreciation of the economic and social importance of cultural and creative industries (CCIs). They are becoming one of the most dynamic segments of the global economy. According to UNESCO, cultural and creative industries represent around 3% of the world economy GDP and 30 million jobs worldwide. Throsby (2010) emphasizes that assessing the contribution to GDP of CCIs requires to capture the direct, indirect and induced effects on other industries. Hence, according to a recent report commanded by the International Federation of the Phonographic Industry (Oxford Economics, 2020), the contribution to the European GDP of the music sector amounts to €37.6 billion, of which 46% is generated by the sector itself, that is the economic activity of recording companies and studios, publishing companies ... (direct impact). 28% corresponds to the indirect impact, the music sector’s expenditure on inputs of goods and services from the rest of the economy. The remaining 26% of the total impact is supported by the induced impact, i.e. the payment of wages by firms in the music sector and along its supply chain.

Pricing free goods and public goods

However, the main issue with the assessment of the contribution of CCIs to GDP relates to the fact that GDP hardly captures the value of economic transactions that are not at market prices. Benefits from unpaid consumption are completely disregarded in national accounts (Sobolewski, 2021). Yet, a lot of CCIs’ services are made available as public goods (they receive public subsidies on the price paid by consumers does not reflect the real cost) or as free services with advertisement.

Basically, there are two possible methods to calculate the use value of zero-price services: revealed preference (RP) or stated preference (SP). RP uses actual demand data. For instance, hedonic price model estimates the value of an unpriced feature of a product by observing price differentials for goods or services that propose or not this unpriced feature (i.e. impact of the closeness of cultural heritage on real estate prices). However, RP methods are not without limitations. They don't allow to take into account option and non-use values¹, they require to collect a lot of data and are subject to confounding or multicollinearity problems (Willis, 2014). SP methods overcome these limitations by deriving preferences and underlying utility parameters from choices declared in a survey. The two main approaches are *contingent valuation*, based on responses to surveys asking people to report their value for specific hypothetical benefits (willingness-to-pay, WTP) or specific hypothetical damages (willingness-to-accept, WTA), and *conjoint analysis* that collects preference or choice data among multi-attribute alternatives.

Stated preference methods are now considered a mainstream approach in non-market valuations (Sobolewski, 2021), and among them contingent valuation is by far the most popular since it allows to reproduce a hypothetical market where the good in question can be "traded" (Mitchell and Carson 1989). The hypothetical nature of choices used for preference revelation is the key target for critics (Sobolewski, 2021)². However, a two decades separate methodological work programme aiming to reduce the hypothetical bias and improve the survey format helped at refining the elicitation protocols (e.g. Johnston et al., 2017).

How to measure the economic contribution of digital goods?

Digital cultural and creative goods are the source of an odd paradox when it comes to measure their economic importance through their contribution to GDP. They are considered of the utmost importance for reducing barriers to access to culture for individuals socially or geographically disadvantaged, yet they are at best poorly or most often not at all reflected in GDP. These activities indeed generate a large consumer surplus but are invisible in the companies revenue statement! Hence the share of IT in GDP has remained around 5% for the past four decades (Brynjolfsson and Collis, 2020).

If free goods have always existed and the issue of taking them into consideration in GDP is not new, in the digital era what used to be an exception tends to become usual. The growth of the digital sector justifies that this is now time to take fully into account this problem. For many cultural goods, as well as for social media or news, the digital era means that the marginal cost of producing an additional version of the good is nearly zero. The demand is no more monetized through selling a rival good (at a price

¹ Option value corresponds to the possibility to benefit from a good or a service in the future, non-use values correspond to existence value (just know that the good exists without consuming it) or bequest value (preserving the good for future generation).

² Among other limitations of stated preference methods, should be underlined (Mitchell and Carson 1989; Bateman et al., 2002): strategic behavior (such as free riding), anchoring bias (the order of presentation of the possible choices has an impact on the valuation), and information bias (the framing of the question influences the valuation).

much higher than the marginal cost). Instead, either consumers get the digital product for free but endure some advertisement or they pay a flat rate to benefit from an illimited access to a large catalogue of content. However, advertising revenues represent a pretty bad predictor of the satisfaction of the consumers (Spence and Owen, 1977). A platform might earn the same advertising revenue from two viewers while they have a very different valuation for the content and thus a very different consumer surplus. Likewise, people can get a lot of value from content that doesn't generate much advertising, such as Wikipedia or email (Brynjolfsson and Collis, 2019).³

Two alternatives exist. First, estimating the value of a good or a service from the time it takes to consume it. Second, estimating the amount of money a consumer would ask for accepting not to access to a digital good or service for a given period of time. Goolsbee and Klenow (2006) initiated the line of research based on the value of time. They stress that while using the Internet generates only limited monetary costs, it is a highly time consuming activity. Accounting for the opportunity costs of leisure time, they use surveys indicating time distribution among several activities and the money value of these activities to estimate a value of the Internet. They estimated the monthly value to use the Internet for U.S. consumers to around \$300. In the same vein, Brynjolfsson and Oh (2012), extending the time usage data on Internet since 2002, develop a new framework to quantify the welfare gain from free goods and services on the Internet. They compare the two conventional approaches to measuring welfare gains, namely, a time-based model and a money-based model. They found that over the period 2007-2011, the average incremental welfare gain from the free digital services on the Internet is about \$106 billion per year (about 0.74% of annual GDP). In contrast, relying only on money-based expenditures generates significantly lower welfare estimates, about \$4.2 billion, which is about 1/25th of the estimate derived from the value of time.

The second alternative is derived from contingent valuation. It aims at measuring the benefits (the surplus) that consumers yield from free digital products and services. Unlike GDP, which is relatively easy to assess because it is reflected in companies' revenue statement and consumers expenses, the surplus is not directly observable. Fortunately, the digital revolution has not only raised tough measurement challenges but has also created powerful new measurement tools (Brynjolfsson and Collis, 2019). Brynjolfsson et al. (2019a, 2019b) propose an original method in which they use digital survey techniques to run massive online choice experiments examining the preferences of hundreds of thousands of consumers. They are thus in capacity to estimate the consumer surplus for a great variety of goods, including free ones that are missing from GDP statistics. More precisely, their method consists

³ To illustrate the difficulties of GDP to fully take into account digital innovations, there is probably few better examples than the raise of Wikipedia. Hard-back encyclopedia like Britannica or Universalis used to cost several thousand dollars, which means that their customers considered them to be worth at least that amount. Conversely, Wikipedia is a free service with much more articles and an almost equivalent quality. The raise of Wikipedia has diminished the worldwide GDP since, deprived from consumers, the print encyclopedia went out of business in the early 2010s. As reported in Brynjolfsson and Collis (2019), the median value that U.S. consumers place on the free service offered by Wikipedia is about \$150. Hence the U.S. GDP is underestimated by an amount of more than \$40 billion.

in asking participants to make choices: “Would you rather lose access to Wikipedia or to Facebook for one month?”, “Would you give up Wikipedia for a month for \$10? for \$100? ...”. To control for the hypothetical bias, and ensure that people have revealed their true preferences, they follow up with experiments in which participants actually must give up a service before they can receive compensation (Brynjolfsson and Collis, 2019). Box 1, below, illustrate this methodology with the case of valuing the benefits yielded from Facebook.

Box 1 – How to value the benefits yielded from Facebook?

“To measure the consumer surplus generated by Facebook we recruited a representative sample of the platform’s U.S.-based users and offered them varying amounts of money to give it up for a month. To verify the responses, some participants were randomly selected to actually receive payments and forgo the service for the month. We temporarily added them as Facebook friends—with their permission, of course—to confirm that they didn’t log in for that month.

Some 20% of the users agreed to stop using the service for as little as \$1; an equal proportion refused to give it up for less than \$1,000. The median compensation the Facebook users were willing to accept to give up the service for one month was \$48. On the basis of the survey and the follow-up experiment, we estimate that U.S. consumers have derived \$231 billion in value from Facebook since its inception in 2004.

[...] One might think that the value generated by Facebook is accounted for in GDP through its advertising revenues. However, our estimates indicate that the platform generates a median consumer surplus of about \$500 per person annually in the United States, and at least that much for users in Europe. In contrast, average revenue per user is only around \$140 per year in United States and \$44 per year in Europe. In other words, Facebook operates one of the most advanced advertising platforms, yet its ad revenues represent only a fraction of the total consumer surplus it generates.”

Source: Brynjolfsson et al. (2019a)

This method can also be used to assess the benefits from digital goods that generate revenue from user fees and subscriptions. According to Spotify’s 2021 revenue statement, the annual ARPU in the U.S. is around \$26 (free and pay users mixed together). The annual valuation of the median U.S. users for music services is estimated by Brynjolfsson et al. (2019a) at \$168 (around 6 times more). Likewise, users pay \$120 to \$240 a year for video-streaming services such as Netflix, Hulu, and HBO while the above study estimated that the consumer surplus generated from those services is five to 10 times what users pay to access them (annual valuation of \$1,173).

From that approach, Brynjolfsson et al. (2019b) developed a new metric for measuring the GDP for free goods based on the computation of the benefits instead of costs, they labeled it GDP-B. For instance,

they estimated that adding the benefits of Facebook would have increased the GDP growth by 0.05 to 0.11 percentage points per year on average in the U.S. since 2004.

Conclusion

GDP-B stands as an alternative metric that could supplement the traditional GDP framework by quantifying contributions to consumer well-being from free digital cultural and creative goods, and other non-market cultural goods and services (free live music, dancing, ...). This approach is relatively inexpensive and easy to implement on a regular basis on a representative panel of consumers. “Conduct large-scale surveys asking respondents how much they’d need to be paid to give up a given good for a certain period of time and then validate those results by running smaller-scale studies with real monetary incentives” might represent a pragmatic way to measure the contribution to economic activity for goods and services that otherwise remain totally or largely out of the scope of traditional measurement tools (Brynjolfsson and Collis, 2019).

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