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RESEARCH ARTICLE

The value of data matching for public poverty initiatives: a local voucher program example

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Abstract

The recent surge of data-driven methods in social policy have created new opportunities to assess existing poverty programs. The expectation is that the combination of advanced methods and more data can calculate the effectiveness of public interventions more accurately and tailor local initiatives accordingly. Specifically, nonmonetary indicators are increasingly being measured at micro levels in order to target social exclusion in combination with poverty. However, the multidimensional character of poverty, local context, and data matching pose challenges to data-driven analyses. By linking Dutch household-level data with policy-initiative-specific data at local level, we present an explorative study on the uptake of a local poverty pass. The goal is to unravel pass usage in terms of household income and location as well as the age of users. We find that income and age play a role in whether the pass is used, and usage differs per neighborhood. With this, the paper feeds into the discourse on how to operationalize and design data matching work in the multidimensional space of poverty and nonmonetary government initiatives.

Policy Significance Statement

The research highlights how complex poverty policy initiatives are and how different perspectives need to be integrated in order to understand underlying issues. This is contrary to the push within local government to increasingly rely on (big) data-driven evaluation methods. Based on what we see in the Dutch case, data-driven evaluation methods can potentially disguise some of the issues that cause low participation in poverty initiatives, such as voucher programs. And underlying hurdles can only be seen when such a data-driven approach is used complementary to qualitative methods.

1. Introduction

There has been a surge in the use of data-driven methods in the social policy field. The availability of more granular administrative and micro-data facilitates these efforts. In addition, technological and statistical advances in data processing have shown opportunities to use individual and household-level data to identify the effects of policies on specific target groups—for example, for welfare or labor market initiatives (Trivellato, 2019). Simultaneously, data integration techniques are being proposed in the

context of poverty policies, in order to link or match information that comes from two or more datasets (Montrone and Perchinunno, 2013; d’Ovidio et al., 2020). There is further a strong demand for estimating the effect of policies on outcomes and using big data analytics for evaluation (Marx et al., 2015; Barbero et al., 2016). In the context of the current debate, this paper asks *how data linking can help to measure the uptake of local voucher programs*. The expectation is that with more and better data, costs of interventions can be calculated more accurately for public policy deliberations in order to understand what a specific intervention has achieved (Cook et al., 2014). The paper links household-level data with policy-initiative-specific data at local level. Based on this, we find that data-driven assessments of public services can provide information about the reach of public incentives, however, they are unable to answer the questions of how and why a service is (not) used.

Poverty is a complex human phenomenon associated with an unacceptably low standard of living. It has multiple dimensions, manifestations, and causes (World Bank, 2018), but in developed countries (i.e., those with a high Human Development Index), it is mainly determined by the fraction of inhabitants below a certain income threshold. The complexity of poverty as a problem stems from its many concurring causes, represented in the large variety of arguments that can be found in the scientific literature (Salverda et al., 2013, 2014; Brady and Jäntti, 2016; Pemberton et al., 2016). Due to this complexity, there are efforts to collect data at micro levels for more granular information with the goal of linking that data to national or even international databases. In this context, there are larger efforts at European and international levels to harmonize poverty data. This also poses a trade-off for policymakers, since ensuring international comparability requires the use of universal definitions and harmonized methodologies, which can limit the flexibility to measure country-specific indicators (UNEC, 2017).

In this context, we add to the discussion by focusing on the challenges and opportunities of linking data in order to gain insights into the uptake of a specific policy initiative: a Dutch local voucher program. There is extensive research on the use of vouchers in the (North American) housing market and for offering access to different education facilities without spatial restrictions (Steuerle, 2000; Colin, 2005; Levine and Levine, 2013; Wolf et al., 2013; Varghese, 2016), but limited insights into other types of nonmonetary poverty initiatives outside the United States. For this research, we look at use of vouchers for recreational activities with the goal of participation for disadvantaged groups in one Dutch municipality. Social participation is key for people to move out of poverty, which is why programs that focus on participation such as the voucher programs are especially interesting to analyze and evaluate. The Dutch context provides the opportunity to link data through Statistics Netherlands by combining program-specific information at local level with individual-level data at national level. For our data analysis, household-level data retrieved through Statistics Netherlands was linked to participants receiving a local poverty pass. The poverty pass data are biannual (2009, 2011, 2013, and 2015) with information on whether the pass has been used. Household-level data contain the number of people in the household, including the number of children, income, country of origin, and neighborhood location (so-called “buurt,” a four-digit postal code). Based on these data, we combine household-level data with policy-initiative-specific data in order to assess different uptake of the poverty pass according to household characteristics.

The paper is structured as follows, in Section 2, we take stock of the current literature on the multidimensional aspects of poverty, including ways of measuring poverty at neighborhood and household-level and adjusting policy to the latest findings. Section 3 describes the data and methods of this paper based on local information from the Dutch municipality in combination with the Dutch Statistical Database. The findings are summarized in the fourth part of the paper assessing what can and cannot be learned from applying new techniques to these types of data in the local context. The paper ends with a conclusion section.

2. Local Poverty Initiatives and the Use of Data

There is a plethora of policy instruments at national- and local-level targeting poverty. “These include policies aimed at boosting the demand for workers, and particularly the demand for people with low levels of education or weak work experience...policy can stimulate (e.g., through fiscal reform) or support

(e.g., through child care) people to take-up work or to increase working hours” (Marx et al., 2014, 2098). Matching the policy instrument mix to the underlying causes of poverty requires “tool knowledge,” “design knowledge,” and “operating knowledge” (Salamon, 2002; Varghese, 2016). Many countries also rely on direct as well as indirect measures that play out at national and local levels. This instrument mix makes it harder to differentiate between the effects of one initiative from other public services. This is not to say that the government chooses tools solely based on data or research—“there are typically political or ideological constraints on the use of the instruments” (Hood and Margetts, 2007, 148). This is further complicated by having to match the instrument to various policy contexts—some in which the instrument might be effective and in others it might not be. This paper focuses on a local policy instrument that gives access to goods or services: the voucher program. To make decisions about voucher programs, specifically and the policy mixes more generally, and evaluate the effectiveness of poverty programs, the way poverty is defined and measured plays a crucial role.

2.1. *Defining and measuring poverty*

“The definition of poverty underpinning most recent research in Europe relates to exclusion from the ordinary life of the society due to lack of resources” (Marx et al., 2014, 2065) and has also served as the foundation for policymaking by European governments. From this perspective, poverty has two main elements: The inability to participate and that inability is linked to the lack of resources. The most common approach to measure poverty and to compare among countries is to calculate income thresholds as proportions of the median income of a country, mostly using 50 or 60% as the metric (Marx et al., 2014). The idea behind this measurement is that, linked to the poverty definition, for those falling behind this threshold, it is less likely that they can participate fully (Atkinson et al., 1995; Whiteford, 2008). Thereby, measuring income is only one element of multiple perspectives that can be used to evaluate the distribution of living standards. A common distinction is that of monetary indicators, such as expenditure, income or wealth, and nonmonetary indicators, which include standard of living, happiness, or life satisfaction (Morelli et al., 2015).

In the context of monetary indicators, one aspect driving the discussion around defining and measuring poverty is that of unpacking household-level dynamics. The simplest and widely used measure remains that of headcount within each household, differentiating between (single) parents and children. Less used in policy, but more and more developed in recent years are intra-household inequality studies (Chiappori and Costas, 2014). For example, combining two levels of analysis: an individual’s labor market status as well as the household’s income (adjusted for headcount within the household) is a way of having a more nuanced look at poverty. However, this interpretation is complicated by the fact that the labor market status of other people in the same household also has to be considered in addition to dependent children (if there are any; Marx et al., 2014). Another dimension to intra-household dynamics is longitudinal measurements linked to generational poverty. Referred to as “the poverty trap,” it describes people who are more likely to be poor, when poverty is “(a) persistent, (b) perpetuated across an individual’s life or across generations, and (c) perpetuated by socioeconomic features outside of the individual’s control” (Ziliak, 2015, 36). In short, the living situation internal and external to the household matters. This includes the type of neighborhood, resources, infrastructure, or access to certain education systems. Here, government intervention can be effective, because it is able to circumvent households’ inability to pay for educational advancement (Chiappori and Costas, 2014).

Such measurements require longitudinal data in order to track households and individuals over time. This also allows researchers to identify who is moving in and out of low income separate from those who are persistently in the low-income bracket (Marx et al., 2014). However, such data are sparse and hard to disentangle from neighborhood effects (Small and Newman, 2001). Spatially disaggregated data also often do not exist. Most data in this policy context stem from household surveys, which are costly to carry out and often overlook the poorest people (Blumenstock et al., 2015; Xie et al. Jean et al., 2016). For evaluations, researchers have also relied on counterfactuals based on “measures of the outcome variables in a community prior to the intervention” (Hollister and Hill, 1995, 129). The issue

that arises when using a counterfactual is that spatial boundaries are hard to define while also accounting for the inflow and outflow of people across those boundaries of the community being measured (Hollister and Hill, 1995).

Technologies as well as more advanced ways of collecting data have facilitated new ways of designing, monitoring, and evaluating policies and predicting poverty (Jean et al., 2016; Giest, 2017). For example, data from social media have been used to measure unemployment and economic development (Eagle et al., 2010; Choi and Varian, 2012). More recently, mobile phone metadata as well as satellite imagery in combination with machine learning have been utilized to predict poverty and wealth (Blumenstock et al., 2015; Jean et al., 2016). While more data are being collected and new ways found to utilize it for an application in the poverty context, some emphasize the necessity of qualitative work in order to understand “who counts and what counts as value added” (Jerven, 2013, 112).

This discussion around indicators is also reflected in larger efforts at European and international levels to harmonize how poverty is defined and measured. This is because the “use of the same poverty definitions operationalized in different ways (e.g., by using different equivalence scales, or using income rather than consumption as a welfare metric) can produce quite different results, both within and across countries” (UNECE, 2017, 8). This also poses a trade-off for policymakers, since ensuring international comparability requires the use of universal definitions and harmonized methodologies, which can limit the flexibility to measure country-specific indicators (UNEC, 2017).

2.2. Antipoverty policy

There has been a shift within governments in the last 15 years toward poverty—in terms of how it is prioritized as well as the measures that are taken to address it. Poverty has been added to the international Millennium Development Goals and at regional level, the European Union has, in the Europe 2020 program, added the objective of reducing the number of people in or at risk of poverty and social exclusion by 20 million (Atkinson and Bourguignon, 2015). While globalization and the financial crisis have had a broader effect on income inequality within countries, most changes have been driven by national and regional policies (Gornick and Jantti, 2016). Most notably, the emphasis on longitudinal poverty research and the cumulative effect over the years has had an impact on how antipoverty policy is thought about and assessed. Specifically, nonmonetary indicators are increasingly being measured at micro levels in order to target social exclusion in combination with poverty (Marx et al., 2014; Aaberge and Brandolini, 2015). In terms of reducing the inequality of market incomes, the most common policy response is educational expansion based on evidence that the risk of poverty falls as educational attainment rises (Atkinson and Bourguignon, 2015; Gornick and Jantti, 2016).

Especially in a multi-dimensional context such as poverty, governments usually already deploy a multiplicity of instruments where “the addition of others may be diminishing, nil, or negative results owing to mutual self-cancellation and/or diminishing returns” (Hood and Margetts, 2007, 150). This can lead to narrowly defined interventions failing to have an effect long-term due to interaction of physical, economic, and social factors (Brown and Richman, 1997; Marx et al., 2014). In essence, this implies a good understanding of the contextual factors at play when deciding on changing or adding policy instruments. For poverty, this depends on the composition of the low-work-intensity population and the underlying causes of low-work intensity. To understand the poverty context for policy decisions, some researchers have focused on micro data. Alongside the focus on social in- and exclusion, micro levels, such as intra-household data, are being used to capture the multidimensional nature of poverty. Especially for government’s noncash spending on poverty, researchers have employed micro data “to assess who is benefiting from such expenditure and to what extent, and to compare overall inequality and (sometimes) poverty levels when this noncash income is included” (Marx et al., 2014, 2109).

In this context, vouchers have gained popularity, because they are directly delivered to consumers, have limited red tape attached and can target specific aspects of poverty, such as food shortage (food stamps).

2.3. Voucher programs

Voucher programs are specific types of policy instruments that are “a means of paying for goods or services that is issued by the public authorities to individual ‘consumers’ who are authorized to use it in any approved institution for the specific purpose for which it was issued” (Colin, 2005, 21). Thus, the voucher system is a form of redistribution where the provider is reimbursed by the government if the voucher is presented for services or goods (Varghese, 2016). The voucher can thereby be explicit or implicit—it can take shape in form of food stamps (explicit) or in form of services such as housing or school enrolment (implicit). In short, vouchers are “consumer-sided subsidies” (Salamon, 2002; Steuerle and Twombly, 2002).

A big component of vouchers is the ability to choose, since it gives subsidized consumers the choice of providers for goods and services. However, vouchers also restrict options in that the types of goods and services that can be purchased are dedicated to a specific use, such as food or housing (Steuerle, 2000). Choice is also intrinsically limited, due to a lack of mobility of under-served populations or a lack of knowledge on, for example, school systems. Another issue being raised in past research is the administrative burden of obtaining vouchers for those applying and using them, depending on the distribution procedure in place by government (Thrope, 2018). Thomas and Alozie (2019) also highlight that the underlying logic of vouchers is that recipients are supposed to be rational actors who will act in their own best interest when presented with an opportunity. However, a broader mix of factors seem to be at play, “leading to the clear observation that, as well-meaning and as theorized as vouchers may be, simply handing them to the poor is not enough” (Thomas and Alozie, 2019, 33). In short, additional measures may be required to make vouchers viable as an instrument to support those living in poverty. Most of the research on vouchers focuses on housing and education as well as their market effect. For example, the idea that parents are allowed to enrol their children in a school of their choosing with the goal of improving graduation rates among minors in disadvantaged neighborhoods (Levine and Levine, 2013; Varghese, 2016). The literature shows that voucher systems reduce red tape, because they are a direct instrument reaching citizens and, in many cases, do not even require an application on the side of the recipients. Some vouchers are automatically sent to those that qualify when falling below a certain income (Colin, 2005). However, measuring voucher effectiveness is difficult:

Whatever the initial assessment of the merit of vouchers as a mechanism, they also need to be re-evaluated over time. Like many government programs, it is often difficult to get good measures of outputs, much less outcomes, as opposed to inputs or dollars spent. Steuerle (2000), 34)

In other words, it is difficult to differentiate between government actions (outputs) and the results of those actions (outcome) in connection to input.

Taken together, current literature on poverty shows that research and policy struggle in offering precise measures for assessing specific poverty initiatives—be they monetary or nonmonetary, indirect, or direct. This has to do with the multicausal nature of poverty as well as the contextual and intra-household dynamics affecting poor individuals in a spatial and over-time manner. Given this complexity, for this paper, we look at one voucher program targeting participation in society through giving free or discounted access to social activities, such as sports or culture. This is linked to micro-data on spatial information of households and household characteristics, such as the number of people in the household, including the number of children, income, country of origin and neighborhood location (“buurt,” a four-digit postal code). Based on these data, we combine household-level data with policy-initiative-specific data with respect to the poverty pass.

3. Context, Methodology, and Data

3.1. The Dutch context

The Netherlands has the fifth lowest at-risk-of-poverty rate at 13.2% (CBS, 2019a). There is a collection of measures in place to counter poverty. The simplest one (except price control and generic macroeconomic policies) is the benefits programs, which is a compensation of income up to a socially acceptable

minimum. Other measures implemented, especially since the 1980s, are usually centered on increasing participation in the labor market, that is, to create new jobs in order to employ as many people as possible, leaving benefits delivery as a complementary policy in the cases where job (re-) insertion is not possible. This general policy, if successful, not only reduces the cost of benefits, but also promotes economic growth (Vrooman and Hoff, 2013).

However, data shows that employment and poverty are not strongly correlated (Marx et al., 2012). On the one hand, the majority of the jobs created in this period went to newcomers in the labor market, not to people who were depending on benefits (De Beer, 1996; Marx, 2007). On the other hand, absolute poverty was essentially stable in these decades, and the relative poverty (where the threshold is defined as a function of the whole distribution, such as the median) even increased (Marx, 2007). Additionally, there is a category of the workforce who has a job and is still poor, the working poor (Danziger and Gottschalk, 1986; Marx et al., 2012; Marx and Nolan, 2014), which accounts for the 5% of the working population (Kruis and Blommesteijn, 2010). Overall, the employment-focused approach to reduce poverty does not seem to result in a significant reduction of benefits' recipients, nor in less poor people, a finding present also in other countries (Brewer et al., 2006; Corluy and Vandenbroucke, 2017).

In the Dutch system, the local government is responsible for poverty policy and debt assistance, which means that funds are distributed centrally through the national government, however policies at local level can differ. Framework agreements between the central government and municipalities exist through the Association of Dutch Municipalities. One of the basic principles that unites the local plans is the idea that social participation is key for people to move out of poverty, which is why programs that focus on participation such as the voucher program discussed below are especially interesting to analyze and evaluate (Ministry of Social Affairs and Employment, 2009). In fact, when considering measures for social exclusion, defined as “members of a household who are able to work, but have little or no paid employment or are facing serious financial problems,” then almost one in six Dutch people are at risk of poverty or social exclusion (CBS, 2019a). Dutch statistics suggest that social exclusion is associated with less quality of life—linked to general health—and occurs in almost all layers of the population while men, between the ages of 45–55, and people with intermediate and low levels of education are affected more than women, other age groups, and highly educated citizens (Coumans and Schmeets, 2020). Thereby, the disposable income of a household plays an important role for social exclusion: For those in the lowest income bracket, almost 1 in 10 feels excluded (Coumans and Schmeets, 2020). Voucher programs, such as the poverty pass, aim to tackle the challenge of social exclusion by facilitating participation in social activities for those with low or no income.

3.2. *The poverty pass*

We present a case study of a voucher program in one Dutch municipality, a so-called poverty or city pass, for those categorized as poor. The purpose of the poverty pass is to promote social participation by its holders specifically for sports, culture, and recreation. This happens along two lines: (a) by overcoming financial barriers that prevent people with a minimum income from participating in social activities and (b) by encouraging holders of the pass to make active use of the activities offered as part of the pass program. The pass is issued by the municipality upon request—so it cannot be purchased and is also not automatically distributed to households. If an individual in the household is on welfare, a letter is sent stating how this individual/ the household can apply for the pass. If the household is not on welfare, but would still qualify for the pass, individuals may apply without the letter. The application is done through a dedicated website and involves five steps:

1. Filling in the application form.
2. Printing out the form.
3. Signing the form.
4. Writing name and BSN number on each page (also in the attachments).
5. Sending in the form with attachments to the Municipality.

The application form has four pages that request personal information about the applicant as well as information about the partner living in the same household. There is a section dedicated to income from different sources (e.g., pension, employment, and loans) as well as capital and/or debts. The form can be used to apply for a poverty pass for several family members at the same time. Further, the form requires that a copy of an ID card or passport is provided as well as financial information about income, assets, and debts for the applicant and other family members. For example, a benefits specification, salary statement, alimony payments, or other sources of income. This financial information is only required when the applicant has not received an invitation from the municipality to apply. The form is only available in Dutch and the application process takes around 8 weeks.

The poverty pass allows holders to participate in sport, cultural, and other social activities for free or at a reduced price that are taking place in the municipality issuing the pass. The activities range from ice skating or swimming to museum visits or art classes. For poverty pass holders, some of the activities are free of charge, while others are discounted. Children between the ages of 4 and 18 are allowed to participate in one cultural and one sport activity for free, if the household holds a poverty pass with a cap of 330 Euro per year, per activity. In addition, swimming lessons and swimming diplomas are free of charge for children of pass holders in this age range. If kids require additional material, such as sport clothes to pursue such activities, there is a separate foundation that works in collaboration with the municipality where parents can apply for funding and/or material. This is capped at 150 Euro for the first request and 100 Euro for any follow-up request after 1 year. For this same group of children, those aged between 4 and 18 years of age, parents can apply for a public transport card that allows for free travel on weekends and during school vacations. This needs to be reapplied for each year. Those providers offering free or discounted activities to pass holders are being reimbursed by the municipality. Currently around 53,000 families in the Dutch municipality being looked at have such a pass.

3.3. *Linking of datasets*

In conjunction with a push for the use of more and larger datasets, there have also been efforts around harmonizing data in the Netherlands more generally and the municipality at the centre of this research specifically—especially around poverty. This is mostly done by combining data from Statistics Netherlands with household-level data at municipal level (van der Sangen, 2018). In the Dutch context, Statistics Netherlands uses the social security number (BSN), which is converted into a unique identifier (RIN) to link different datasets with information about individuals. There are however different definitions of poverty used, which create slightly different thresholds for an individual to fall into the poverty category. These differences not only pertain to the level of income, but also how this applies to various household types over time. The most commonly used definitions in the Dutch context are the low-income threshold defined by Statistics Netherlands, the policy-based income threshold often used at municipal level, as well as the European poverty line and the budget limit of the Netherlands Institute for Social Research (Sociaal en Cultureel Planbureau; CBS, 2019b).

For the data analysis of this research, we use micro data about pass usage at municipal level combined with household information from Statistics Netherlands (CBS). The definition of poverty that has been used here is the one that the Dutch Municipality (*Gemeente*) uses, where a household is considered poor if their standardized income is below 130% of what is considered the social minimum for that household. The main goal is to understand which demographic groups use the pass. In order to do that, we not only need data about the pass, but also general information about its users, since the municipality cannot collect such information on a regular basis. Therefore, we have two datasets that are being linked at the individual level. The poverty pass data is biannual (2009, 2011, 2013, and 2015) with information on who uses the pass. It is a collection of entries where each holder of the pass is identified, and the usage is registered as a boolean value (the pass has been used by the person/it has not); there is also a second value, which registers if the person has been a beneficiary of any other policy instituted by the municipality. These data have been provided for the years 2011 and 2013. And second, census data are used based on the RIO (Regionaal Inkomensverdelingen) table provided by CBS (Statistics Netherlands). This table is a

collection of entries about inhabitants of the Netherlands, and in particular, of the municipality of interest, where some information such as age, gender, income, and neighborhood. Additionally, the table indicates to which household each person belongs, allowing to identify the total income of a household.

The two datasets were linked in the CBS environment, meaning that the poverty pass data was provided directly by the municipality to CBS, which proceeded to hash the BSN (the social security number, which is unique to each legal resident in the Netherlands has) into their own identifier (RIN), in order to guarantee the anonymity of the data. Then, the two datasets were joined on the household level, meaning that our dataset consists of the collection of households present in the municipality, from the RIO table for the respective years, with the addition of the poverty pass data assigned to each of them. It has to be noted that there are two ways of realizing the linking, since not all the households are present in the poverty pass data. The first corresponds to an inner join, that is, the final dataset is the intersection of the households contained in the two datasets. The second corresponds to a left join, where the left table is the RIO table, that is, the final dataset is formed by the entries in the RIO table, for which there will be missing data for the columns provided by the poverty pass data, on the households not included in the latter dataset. This distinction means that the first dataset represents the fraction of holders of the card, while the second dataset shows the fraction of actual *users*, among card holders.

A particular interest of this work is the situation of pass-holders with respect to income, and with respect to poverty. The RIO table contains an entry that specifies how much that social minimum is, allowing to reproduce exactly the Municipality's categorization. Additionally, we consider a *working poor* households' category, which is defined as households where an adult has a main income from salary or self-employment. It has to be taken into account that the variables have to hold for the household, and the data are for the person, meaning that some household variables have to be constructed ad hoc; additionally, many of the variables in the RIO table are correlated. This leaves few free dimensions, which are listed in Table 1.

4. Findings and Discussion

The data of individual usage of the poverty pass is analyzed in terms of household income, location (neighborhood) and usage levels as well as card user age. We find that income and age play a role in

Table 1. Household variables used to assess the usage of the poverty pass

Variable	Regional Income Distributions (Regionaal Inkomensverdelingen, RIO) variable name	Description
Household (HH) size	<i>ahl</i>	Number of people in the household.
Workers in Household (HH)	<i>ahlmi</i>	Number of people in the household that have a salary or an income through self-employment.
Age	<i>lft</i>	Average age of people in the household above 18 years.
Neighborhood	<i>buurt</i>	Neighborhood where the household is located.
HH income	<i>gestinkh</i>	Standardized household income.
Poor indicator		Positive when $percsm < 130$ (130% of social minimum)
Working Poor (WP) indicator		Positive when $percsm < 130$ and $ahlmi > 0$.

The value of data matching for public poverty initiatives: A local voucher program example.

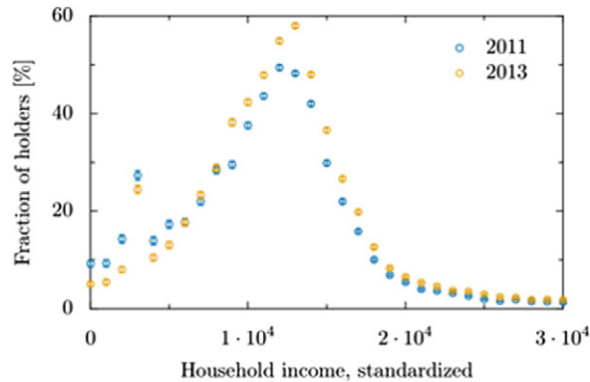


Figure 1. Usage of the poverty pass with respect to standardized household income.

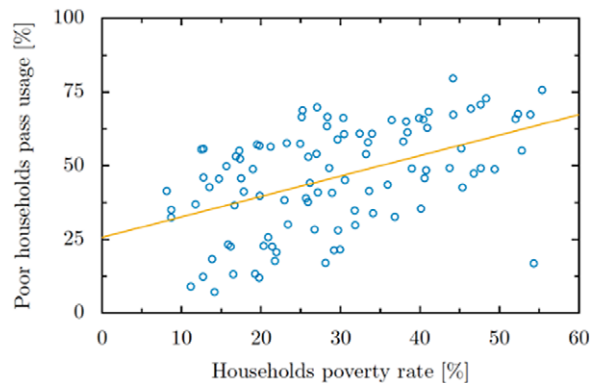


Figure 2. Usage of the pass with respect to household poverty rate and pass usage per household.

whether the pass is used, and usage differs per neighborhood. The analysis is visualized below, starting with income.

Figure 1 shows the usage with respect to household income. The sharp decay around 15,000 euros is due to the fact that this is, roughly speaking, the poverty line in the Netherlands, so it is the threshold after which it becomes less likely to own the pass in the first place. However, more importantly, usage of the pass peaks, and drops also when approaching very low-income levels. In other words, the usage of the pass seems to be less attractive in very poor households.

To further unravel the usage differences of very poor households, we look at how many households used the pass per neighborhood (Figure 2). This analysis shows that the poorest neighborhoods have the highest usage. Looking more specifically at the usage of the card among poor households, that is, the ratio between the usage rate and the poverty rate per neighborhood, as a function of the poverty rate, there is a significant correlation. This implies that poor people in poorer neighborhoods are more prone to use the card than poor people in not-so-poor neighborhoods.

Card usage with respect to the age is shown in Figure 3. Three large groups can be identified. In the youngest group, the usage of the pass increases with age, up to around 15% at the age of 35. This usage remains stable in the second group, up to age 60. The third group is composed of people with an age of above 60, where the usage grows up to 30%. The usage decays again for ages higher than 75 (Figure 3).

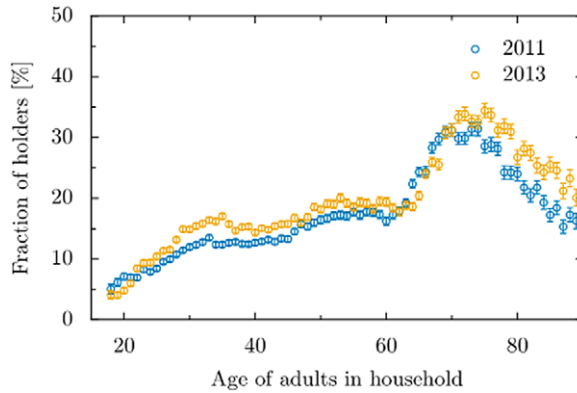


Figure 3. Usage of the pass with respect to the age of adults in the household.

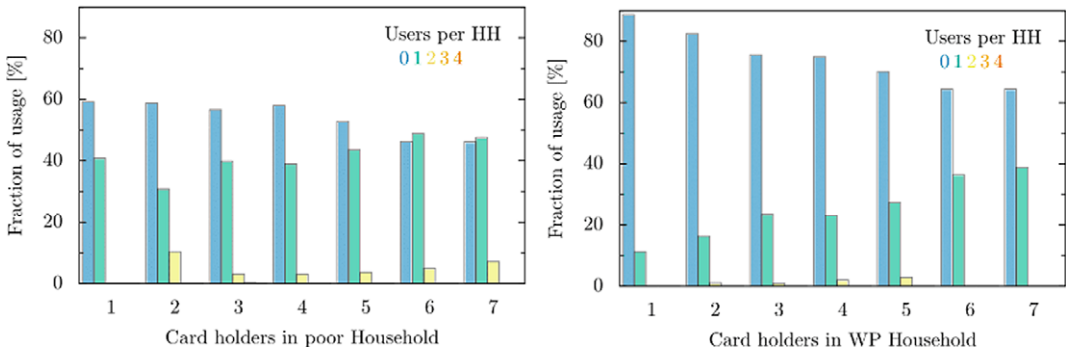


Figure 4. Fraction of users of the pass in each household, divided by the amount of pass holders per household.

Looking specifically at usage patterns, the data show that the majority of households make no use of the poverty pass. We separated the output data into poor and working poor households to see whether these two groups show different behavioral patterns with regard to the pass. We find that for the poor population the majority of the households make no use of the card, as seen in Figure 4 Figure 3, on the left. This effect is further increased when we refer to the working poor segment, as seen in Figure 4 Figure 3, on the right, for which the fraction of households that do not use the pass is always above 60%—regardless of the number of household members having a pass.

As a general note on the dependence on household size, it has to be remarked that it is natural that the amount of usage increases with household size; however, the observed increase is nowhere near the expected increase. Take as an example, the usage in the working poor households. If we assume that there is a base rate of usage p , given by the fraction of users in single households (11%), then we can estimate the fraction of users in a household of size n as $1-(1-p)^n$. For a household of size $n = 5$, this fraction is 44%, but the data indicate that is below 30%. In this calculation, we are assuming that each member of a household has the same probability of being a card user, which is not true; however, for all households and for the poor households, there is not a significant increase of the pass usage with the household size.

These dimensions alone are largely inconclusive in that they show levels of usage overall as well as for specific groups, but they do not indicate why uptake differs across groups. Combining this with previous research on voucher programs as well as some of the contextual aspects of the Dutch municipality, however, we can speculate on some of the hurdles around obtaining and using the pass for different groups of the population. The application for the pass is only available in Dutch and requires several steps around

printing, signing, and sending in the application, which can be time-consuming, and requires language as well as digital skills. Awareness around the pass might be particularly limited for those households that do not receive a letter that encourages them to apply, such as those households in the “working poor” category, but requires a citizen to research or know about the pass and check their own eligibility. Once a household obtains a pass, it has to be shown when being used at a location—and since 2011 and the introduction of the “smart” poverty pass—also scanned by the facility it is used at. Previous research indicates that this can heighten the sense of shame when participating in social activities—especially for younger age groups (Gubrium, 2012). For activities linked to sports for children, there are additional administrative procedures that need to be followed in order to obtain funding for free travel on public transport or sport clothing on a yearly basis. This is done through different services, such a foundation, and linked to different rules and regulations. Navigating the different channels for those applications might be challenging for anyone with limited time, but especially a burden if there is a language barrier or a limited educational background. What we can see in the age curve is that the children included in the pass through their parents (ages 4–18) are using the pass more frequently as opposed to the parents themselves. Usage then grows again when kids are independent, and adults are nearing or at retirement age. Choice is also limited in that money is assigned to very specific activities and this cannot be shifted among different items (such as clothing vs. bike repair) or carried over into the following year. Saving up money in order to make a more expensive purchase the following year is also not possible. Further, while having the pass is a gateway to be informed and having access to other support structures, such as school supplies, bikes as well as laptops or phones are handled separately administratively and require additional effort to find and apply for.

In summary, given that the main goal of voucher programs more generally and the Dutch municipal pass more specifically is that of social participation, the data show that the group that would most benefit, those at the poorest end of the spectrum as well as those that are younger and able to move into the workforce, are least likely to use the pass. The data that these findings are based on would also require more granularity in order to draw conclusive recommendations. For example, which activities, at which location and how often it was used. Further, qualitative research asking users directly what some of the hurdles are in using the pass—specifically the low-usage group—would be helpful for a deeper understanding of usage patterns.

5. Concluding Remarks

We set out to answer the question *how data linking can help to measure the uptake of local voucher programs* by looking at the data availability and utilization of one Dutch municipality. The pass data in combination with household and individual information is broken down for income, age, type of household, and neighborhood. These data can thus give a more detailed look at the profiles of those using or not using the pass, however, only reveals limited information on why that is the case. Combining this data-driven approach with previous research on voucher programs highlights additional points for discussion from a policy perspective related to awareness around the existence of the pass, the administrative burden to apply for it and potential hesitations around it being scanned by providers. This has implications for future research. For example, why do some households apply for the pass, but then do not use it? Or, the converse, what are the traits of the households that have a higher usage of the pass? How do people navigate administrative procedures linked to the usage of the pass? This would turn around the perspective of how the pass is looked at, by analyzing personal experiences first and then moving forward from there in order to eliminate hurdles. It has to be noted, however, that this would not be necessarily a departure from a data-driven approach, since effectively this means to add more data that can be used in combination with the pre-existent dataset.

More importantly, however, this voucher program is one initiative in a plethora of programs enacted by different levels of government, where a variety of services are delivered to alleviate poverty. Because of this, the population is affected in a heterogeneous way by various programs, creating the need to evaluate the efficacy of a service with respect to different portions of the population, and, from the supply side, the

current tendency of personalizing public services (Cutler et al., 2007; Ferguson, 2007). In addition, the Dutch context is quite unique in its effort to link micro-data with national datasets to uncover municipality-specific patterns in the data. This is partially enabled by large municipalities in the Netherlands setting up partnerships with Statistics Netherlands and sharing local data as well as the social security number being a unique identifier throughout different datasets.

In conclusion, this paper highlights that additional research is needed on the linking of local micro-data with national statistics and how much it can contribute to assessing poverty initiatives in this multi-dimensional setting of both poverty itself as well as the mix of policy instruments already available. Additionally, looking at supplementary measures to make vouchers viable to those living in poverty by raising awareness around such a nonmonetary program, supporting the application procedure or offering information in different languages. Given that micro-data is available, such small changes could be tracked over-time to see changes in uptake in different groups.

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