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# Migrants' Home Town Associations and Local Development in Mali

Lisa Chauvet\*, Flore Gubert\*,  
Marion Mercier†, Sandrine Mesplé-Somps\*

March 9, 2013

## *Abstract*

This paper assesses the impact of migrants' Home Town Associations (HTAs) located in France on the provision of local public goods in Mali. To this end, we computed a dataset on all the HTAs that have been created by Malian migrants in France since 1981 and geo-localised their interventions on the Malian territory. Thanks to Malian census data, we also built a panel dataset informing the provision of a range of public goods in all the Malian localities over the 1976-2009 period. These two sources of data allow us to implement a double difference strategy, and to compare localities with and without an HTA, before and after its creation. We not only assess whether "having an HTA" makes a difference in terms of local development, but also whether the intensity of the treatment as measured by the number of HTAs intervening in each locality or the number of year under treatment leads to differentiated impacts. We find that Malian HTAs have significantly contributed to improve the provision of water amenities (mainly fountains), health centers and electricity connection over the 1987-2009 period. The impact is found to be stronger when the focus is on the earlier period (before 1998).

*JEL codes:* F22, H41, H75, O55

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\*IRD, UMR DIAL; PSL, Université Paris-Dauphine, LEDa

†Paris School of Economics; IRD, UMR DIAL

# 1 Introduction

Recent years have witnessed a growing interest of scholars, development practitioners and international organizations for the relationship between migration and development. In particular, academic research has strongly focused on the impact of remittances on origin countries, notably on aggregate development outcomes such as poverty and growth and on recipient households' behavior. External remittances have become indeed an increasingly substantial source of financial flows for developing countries, and have outstripped private capital flows and official development aid in many of them. In 2011, remittances were the second largest source of external finance to developing countries as a whole (370 billion dollars) behind foreign direct investment (around 500 billion dollars). They were nearly three times larger than official development assistance (around 140 billion dollars) (Ratha and Silwal, 2012). In addition to sending remittances to their family, migrants frequently contribute to the development of their village of origin by sending collective transfers through Home Town Associations (HTAs) located in destination countries, and aimed at channeling funds to local development projects. These collective transfers have received little attention from the quantitative literature to date, mainly because of data limitations. This paper aims at filling this gap by quantitatively assessing the impact of HTAs registered in France on the provision of local public goods in Mali.

Mali has a long-lasting history of migration, both within West Africa and with the rest of the world. France represents the most important destination of Malian migrants who leave the African continent: in 2011, about 66% of the Malian migrants living outside Africa were in France.<sup>1</sup> Moreover, Malian migrants are actively involved in HTAs. According to Daum (1998), there were 143 Malian registered HTAs in France in 1993. Our own estimate suggests that this number had increased up to 421 by 2009 (Bernard et al., 2013). In addition to providing help and assistance to migrants in their country of residence, the aim of these HTAs is to contribute to the improvement of the communities of origin. In particular, they often channel funds for the provision of public goods such as schools, health facilities. As such, they probably play an important role in the core function of the state. In 2009, almost 21% of the 703 Malian localities were targeted by an HTA.

The emergence of non-state agents in the provision of public goods has taken place at a time when Mali has implemented incremental changes in political decision-making processes and decentralization. The decentralization reform started in 1992. After a wide internal consultation process, the 10,000 Malian villages joined together to form 703 localities (*communes*), themselves regrouped into 49 districts (*cercles*) and eight regions, plus the capital city, Bamako. Since 1998, each locality has had elected representatives<sup>2</sup>, as well as financial and budgetary autonomy. Thus, decentralization has probably led to a significant change in the relationship between public institutions and citizens and brought more bottom-up and community-based development projects. It has notably facilitated collaborative partnerships between migrants' HTAs and local councils in the provision of public goods, where HTAs induced potentially important financial leverage. In this context, the impact of migrants' HTAs is important to assess. However, two opposite

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<sup>1</sup>Figure computed by the authors using data from the representative survey EMOP, *Enquête Modulaire et permanente auprès des Ménages*, INSTAT Mali, 2011.

<sup>2</sup>Communal councilors are elected to a 5-year term.

effects may be expected. On the one hand, HTAs' collective remittances may play as a complement to public resources and relieve binding budgetary and fiscal constraints. On the other hand, HTAs may have crowding-out effects on public funding, thus leaving the targeted localities worse off all else equal. We explore here whether the existence of one or more HTAs in a given locality has improved or not the provision of a range of public goods at the local level. Some small-scale case studies focused on the Western region of Mali (Kayes region) describe migrants' HTAs as substantial sources of funding and provide a census of the development projects they have financed.<sup>3</sup> But to our knowledge, the contribution of HTAs has so far never been systematically investigated, and there is no quantitative evidence on whether their contributions make the localities of origin better off in terms of local public goods than other Malian localities.

In this paper, we adopt a difference-in-differences approach to assess the causal impact of HTAs on the provision of local public goods. We use an original dataset that we computed and which provides an exhaustive list of all the HTAs created by Malian migrants in France. For each HTA, we have been able to find its date of registration, as well as the name of the locality where it intervenes in Mali. Thanks to the four waves of census (*Recensement Général de la Population et de l'Habitat*) conducted by the Malian Office of statistics for the years 1976, 1987, 1998 and 2009, we have also been able to build a panel dataset of all Malian localities from 1976 to 2009. This allows us to compare the provision of public goods before and after the interventions of HTAs (*i.e.* between 1987 and 2009) in the localities with and without an HTA. We investigate the impact of having an HTA both on the provision of public goods at the locality-level and on the distribution of these public goods within each locality. The double difference strategy relies on the assumption that localities from the two groups (*treated* by the intervention of an HTA or not) would have followed parallel trends in the absence of the treatment. Thanks to the data at hand, we are able to test this parallel trend assumption over the period that precedes the intervention of HTAs. Finally, we are able to assess the impact of the *intensity* of the treatment since we know the number of HTAs targeting each locality, as well as the approximate age of each HTA.

The rest of the paper is organized as follows. Section 2 reviews the related literature. The data and descriptive statistics are presented in section 3. Section 4 describes our empirical strategy and benchmark results together with evidence that support the parallel trends assumption underlying our difference-in-differences approach. We then estimate the impact of the intensity of the treatment in Section 5. Section 6 finally concludes.

## 2 Literature review

The provision of public goods is the outcome of interactions between various top-down processes and local collective action (Bardhan and Mookherjee, 2000, Banerjee and Somanathan, 2009). The literature mainly focuses on the role played by social heterogeneity

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<sup>3</sup>The pioneering research on this topic has been written in the 1990s, see for instance Quiminal (1991) and Daum (1998). Gauvrit and Le Bahers (2004) make an inventory of development projects financed by HTAs in 51 Malian localities in the Kayes region, whereas in Charef and Gonin (2005) several case studies at the locality level are undertaken, all of them in the Kayes region.

in the allocation of public goods, since social heterogeneity may imply groups' diverging interests. For example, Banerjee and Somanathan (2007) use two waves of census data in India and show that social heterogeneity was detrimental to the availability of public goods in Indian villages between 1971 and 1991.<sup>4</sup> Miguel and Gugerty (2005) find a similar result for primary school funding and school facilities in rural western Kenya. They relate this finding to the fact that diverse communities are unable to impose social sanctions and fail in implementing efficient collective action. Comparing local ethnic diversity and public goods across two nearby rural districts at the border between Kenya and Tanzania and using the colonial boundaries as a natural experiment, Miguel (2004) shows nevertheless that the impact of ethnic composition on the provision of local public goods differs between those two African countries. When national cohesion is encouraged, the detrimental influence of ethnic heterogeneity disappears. Even though ethnic fragmentation is most often found to have a detrimental effect on the provision of public goods, two recent articles tend to contradict this conclusion. First, Glennerster, Miguel, and Rothenberg (2013) find no significant impact of ethnic heterogeneity on the provision of public goods in Kenya, once ethnic heterogeneity is instrumented by several historical variables. Second, Egel (2013) shows that tribal heterogeneity in Yemen is associated with more public goods, since tribes influence both political patronage and targeted development transfers.

A related but rather distinct strand of the literature has examined the effects of the decentralization of political power on the provision of local public goods. This literature mainly focuses on elite capture and rent-seeking activities (Bardhan, 2005, Bardhan and Mookherjee, 2000, Platteau and Gaspart, 2003). Elite capture refers to the fact that individuals with disproportionate access to social, political and economic power may dominate community governance and appropriate for themselves the benefits of decentralized development programs or projects. Yet, Foster and Rosenzweig (2001), using a panel dataset of 250 villages in rural India over the past twenty years, show that democratic governance generates both an increase in the participation of landless to local councils as well as an increase in the share of public resources allocated to roads (roads increase the welfare of the poor in that case). Chattopadhyay and Duflo (2004) also investigate the impact of local governance on the provision and choices of local public goods. They find that political reservation for women in Indian local village councils has induced a better access to public goods which are closely linked to women's concerns, like drinking water.

The literature on the impact of social heterogeneity and on the consequences of decentralization reforms on the provision of public goods sheds light on the various channels through which migrants and HTAs can influence the provision of public goods in the localities of origin. First, as a selective process, migration generally contributes to alter the social and/or ethnic composition of local communities. It can thus exacerbate existing disparities, and erode social cohesion within the localities of origin, thereby impacting their capacity to provide local public goods. Similarly, the presence of HTAs and their involvement in the provision of public goods may impede collective action within the localities and, again, exacerbates existing diverging interests, especially if the intended beneficiaries do not have much voice in the selection and oversight of the funded de-

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<sup>4</sup>Banerjee, Iyer, and Somanathan (2005) find that the correlation between social division and low level of public goods in India appears prominently in regions that were under British colonial power in the pre-independence period and in those where agrarian power was concentrated in the hands of landlords.

velopment projects. Second, individual and collective remittances may induce income differentials, thereby transforming social and political hierarchies in recipient societies. To the extent that international migrants come from poorer households, remittances can then benefit these households, giving them autonomous sources of income and liquidity (Kapur (2010), in the case of India). This in turn may undermine existing patronage networks and therefore impact clientelist politics. However, HTAs may also empower local and transnational elites and become a medium for certain groups to pursue their own interests. Finally, migrants can influence local governments' expenditures, either through their engagement in the political arena of their localities or through their capacity to impose new norms of governance, greater accountability and transparency.

Some of these mechanisms have been described in the case of Mexico. Allen (2008) supposes that the Mexican political elite can influence voters through patronage<sup>5</sup> or by providing the poorest with public goods. Private remittances make the provision of public goods more likely because remittances reduce the dependence of the poor on patronage. Patronage becomes then relatively more expensive than the provision of public goods for the elite to stay in power. Using Mexican data at the municipal level, the author finds that private remittances tend to increase the provision of public sewers in localities where the share of the population living in poverty is higher. Adida and Girod (2006) find a similar results using Mexican states data. They find a positive correlation between remittances and the change in access to drainage between 1995 and 2000. Their interpretation of the result is however different from Allen (2008). For Adida and Girod (2006) remittances empower citizens to improve their access to public goods, notably because the authors find an increase in return migration in states where remittances are higher. They rule out the possibility that the improvements in access to drainage come from better governance because they find no correlation between remittances and voter turnout.<sup>6</sup>

In the case of Mexico again, the impact of collective remittances on the provision of public goods has also been assessed using the *Tres por Uno* (3x1) Program as a case study. The 3x1 Program was launched in 2002 as a way to support migrants' investment efforts in their locality of origin. It edicts that the funding of a project initiated by an HTA will be covered in part by this HTA, but also by the municipal, state and federal governments, each party contributing to 25% of the total cost. Goldring (2004), Orozco and Lapointe (2004) and Wise and Ramírez (2001) provide descriptive analyzes of the 3x1 Program, looking mainly at the amounts dedicated to development projects and their allocation across Mexican localities. Aparicio and Meseguer (2012) have recently assessed the economic and political bias of the program. They find that high-migration municipalities are more likely to participate to the program, but that, at similar levels of migration, poorer localities tend to benefit less from it. Aparicio and Meseguer (2012) also find a political bias in the allocation of public goods financed by the 3x1 Program, since the municipalities ruled by the conservative *Partido Acción Nacional* tend to benefit more from the program.

With the exception of the 3x1 Mexican project, little quantitative evidence is available on the impact of HTAs, especially in Africa. One major exception is the work of

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<sup>5</sup>Patronage is understood as giving cash to voters in exchange of their vote.

<sup>6</sup>It is worth noting that the likely endogeneity of remittances is not addressed in Adida and Girod (2006). Allen (2008) implements a two-stage least squares approach using the distance to the nearest railroad station as well as the distance from that station to the U.S. border as instruments.

Beauchemin and Schoumaker (2009) on Burkina Faso. The authors explore the impact of HTAs created by internal migrants on the provision of public services (schools and health centers) and other community amenities such as mills and boreholes. They also examine how the presence of HTAs affects infrastructures (all-season roads), and agricultural modernization (market gardening, tractors). To this end, they use a national retrospective (1960-2002) community survey in 600 settlements and provide a discrete-time event history analysis on a sample of villages with no such public goods in 1960. They find a positive and significant effect of HTAs on the provision of social services and roads, with some differences in magnitude from one decade to the other.

The literature thus provides much evidence that the socio-economic local context is a crucial determinant of the provision of public goods. Quantitative evidence on the causal impact of migrants' HTAs remains however scarce.

### 3 Data

We mobilize two sources of data to investigate the impact of migrants' HTAs on the provision of local public goods in the Malian localities over the 1987-2009 period. The first one is an original and exhaustive census of the Malian HTAs in France. The second is a panel of Malian localities that we computed using the 1976, 1987, 1998 and 2009 Malian Population Censuses (*Recensement Général de la Population et de l'Habitat*, INSTAT).

#### 3.1 Home Town Associations

We collected an exhaustive original dataset on Malian migrants' HTAs in France. Identifying migrants' associations is generally tricky, as any non-profit association created in France (also called *Association Loi 1901*) can function without being declared. However, declaration becomes a prerequisite if a bank account is needed or if the association aims at collecting membership fees or arranging fundraising. Declaration is made at the *Préfecture* or *Sous-Préfecture* of the department where the association is located. This simple registration procedure is followed by a declaration of the association's creation in the French Official Journal (*Journal Officiel*), a daily paper edited by the French government containing legal information, official declarations and detailed information concerning new associations: their name, object or aim and main address, as well as the full names, addresses, birth dates and birthplaces of the people in charge of the administration, etc.

Foreigners gained the right to gather in associations in France when the Socialist Party came to power in 1981. It took a few years, however, before the first Malian migrants' HTAs started declaring themselves. Before 1987 indeed, which constitutes the "baseline" year in our empirical analysis, only 13 HTAs had registered, 10 of them operating in the Kayes region. Of course, it is likely that some HTAs were functioning before 1981 without being declared. If this were true, this could bias our results. However, the existing anthropological studies dating back to the 1980s or early 1990s and focusing on Malian associations in France suggest that the first HTAs, the so-called "*Caisses villageoises*" were created for the specific purpose of helping their fellow migrant with any financial problem he might encounter in the host country. In other terms, undeclared HTAs in

the 1970s and early 1980s were not actively involved in the development of the villages of origin.

We thus used the archives of the French *Journal Officiel* to seek all the Malian HTAs declared in France. Concretely, we extracted from the Journal all the associations which contain, in their name or declared purpose, the word “Mali” or any of its derivatives, or the name of one of the 10,000 villages of Mali. The methodology of this data collection is further detailed in Bernard et al. (2013). We ended up with 495 Malian HTAs declared between 1981 and 2011 which aim is to channel funds for the development of small-scale areas (either villages or *communes*). We thus excluded from our census the HTAs targeting regions or even Mali as a whole.

Table 1 presents the distribution of the 421 HTAs created over the 1987-2009 period, by region. Column (1) provides totals, while columns (2), (3) and (4) provide sub-totals after disaggregating the sample according to the date of creation of each HTA.

Table 1: Number of Malian HTAs declared in France

	Total	Before 1987	1987-1998	1998-2009
Mali	421	13	116	292
Kayes	310	10	89	211
Koulikoro	44	1	11	32
Sikasso	10	0	2	8
Ségou	6	1	1	4
Mopti	41	0	11	30
Tombouctou	3	0	1	2
Gao	4	1	0	3
Kidal	3	0	1	2

The spatial distribution of HTAs clearly confirms the role of the Kayes area as the main source of Malian migrants to France<sup>7</sup>: 73.5% of the Malian HTAs created in France before 2009 target a locality in Kayes. The remainder mainly concentrates on Koulikoro (10.5%) and Mopti (9.5%). Then come Sikasso (2.5%) and Ségou (1.5%). Less than 1% of the HTAs target each of the three remaining regions (Gao, 1%, and Tombouctou and Kidal, 0.5% each).

As a last step, we aggregated our data in order to have a final dataset associating each *commune* of Mali with a dummy variable for whether at least one HTA has been found to target it, as our empirical analysis is conducted at the level of the communes.<sup>8</sup> This dataset allows us to distinguish between *treated* localities and their *control* counterparts which have no HTA in France. We exclude from our analysis those localities which were targeted by the 13 HTAs created between 1981 and 1987. The data at hand also provide us with two measures of the intensity of the treatment. We know the number of HTAs intervening in each locality, as well as the date of creation of each HTA, which can be thought of as a *proxy* of the number of years under treatment for each locality. We end up with a sample of 648 localities among which 510 belong to the control group and 138

<sup>7</sup>According to the 2011 EMOP survey, more than 60% of the Malian migrants in France come from this region, which represents less than 15% of the total Malian population.

<sup>8</sup>In the rest of the paper, the terms locality and *commune* will be used indifferently.



to the treated one.<sup>9</sup> In the latter group, 61 had their first HTA before 1998, and 77 afterwards. The distribution of treated and non-treated localities by region is given by Table 2.

One important drawback of these data comes from the fact that we do not have much information on HTAs' dissolution. In theory, any change made in the association should be published in the *Journal Officiel*. Declaring a dissolution, be it voluntary, legal or administrative, is a procedure as simple as declaring a creation, but in practice it is not compulsory and very few associations do it. When assessing the impact of HTAs on the provision of local public goods, we thus estimate a lower bound, given that some associations observed in our data potentially do not exist any more.

Table 2: Number of localities with and without HTA

	Localities	Localities with an HTA created between 1987 and 1998	Localities with an HTA created after 1998	Localities without HTA
Mali	648	61	77	510
Kayes	118	38	31	49
Koulikoro	106	10	17	79
Sikasso	146	2	7	137
Sikasso $\frac{1}{2}$ gou	117	1	4	112
Mopti	107	9	14	84
Tombouctou	41	1	2	38
Gao	12	0	2	10
Kidal	1	0	0	0

### 3.2 Local public goods

Data on the Malian localities come from the four population censuses conducted by the Malian Office of statistics (INSTAT) in 1976, 1987, 1998 and 2009. These censuses provide information on the number and type of public goods at the level of the localities. Due to the evolution of the administrative division of the Malian territory over the period (in particular, the creation of the *communes* in 1998 as part of the decentralization process), the constitution of the panel required that we re-aggregated the villages into *communes* in 1976 and 1987. Thanks to these data, we computed three indicators of local infrastructures for each Malian locality that are strictly comparable between the years 1976, 1987, 1998 and 2009:

- *SCHOOL*: Number of functional primary and secondary schools;
- *HEALTH*: Number of functional health centers, hospitals, clinics and maternities;
- *WATER*: Number of functional fountains.

<sup>9</sup>Because of the 13 localities that were dropped and because of missing data on local public goods for 42 additional localities in the 1998 census among them Bamako (see section 3.2 below), our final database contains 648 localities out of the 703 existing ones.

For each one of these three variables, we also computed the share of the villages in each locality that are endowed with the public good (*SH\_SCHOOL*, *SH\_HEALTH* and *SH\_WATER*). These alternative dependent variables will allow us to assess the impact of the treatment on the distribution of local public goods across villages within the Malian localities.

The Malian censuses of 1987, 1998 and 2009 also provide household-level data on housing conditions. We relied on this information to build three new variables indicating the sources of water supply:

- *HH\_TAP*: Share of households in the locality using a tap as source of water;
- *HH\_WELL*: Share of households in the locality using a well or a drilling as source of water;
- *HH\_FOUNTAIN*: Share of households in the locality using a public fountain as source of water;

All three measures relate to alternative water supply amenities which differ from one another in terms of the initial investment they require. Finally, the household-level data allowed us to calculate the share of households in the locality that are connected to the electrical grid, *HH\_ELEC*.

Table 3 presents the means and standard deviations of our public good measures within the control and treated groups at each wave of the census, *i.e.* in 1976, 1987, 1998 and 2009. The number of schools, health infrastructures and water amenities experienced a sustained increase from 1976 to 2009, the pace of this increase being much stronger after 1987. This is the case for both the treated and the control groups. On average, treated localities started (and ended up) with more of these three public goods. For all of them, the share of villages endowed in each locality also grew a lot between 1976 and 2009, in both the treated and the control groups. Inequalities across villages within treated localities were lower in 1976 regarding the provision of water amenities, while the average shares of villages endowed with schools and health centers in 1976 were similar between the treated and the control groups. Regarding households' access to water sources and electricity, we observe that the share of households using a tap as their source of water increased between 1987 and 2009 in both groups, the treated localities starting from a slightly higher level. The share of households using a well or a drilling remained roughly stable over the period and within both groups. The share of households using a public fountain increased in both groups, the control group starting with a higher proportion in 1987. Finally, the average share of households connected to electricity, though still very low, increased substantially in both samples (the treated group exhibiting a higher starting point).

The empirical strategy and results presented in the following section thus rely on a panel data set at the level of the Malian localities over the 1976-2009 period. In the rest of the paper, we will perform difference-in-differences estimations assessing the impact of HTAs on the provision of local public goods from 1987 to 2009.

Table 3: Local public goods in the control and treated groups, 1976-2009

	Control localities				Treated localities			
	(1) 1976	(2) 1987	(3) 1998	(4) 2009	(5) 1976	(6) 1987	(7) 1998	(8) 2009
SCHOOL	1.175 (1.293)	1.747 (2.200)	4.784 (5.318)	12.90 (11.93)	1.717 (1.933)	2.601 (3.187)	7.239 (6.913)	15.67 (12.65)
HEALTH	0.839 (1.192)	0.990 (1.168)	2.822 (2.813)	2.598 (2.517)	1.268 (1.276)	1.587 (1.867)	4.014 (3.989)	3.558 (3.265)
WATER	0.0490 (0.607)	0.271 (1.486)	1.724 (6.520)	3.429 (7.011)	0.123 (0.841)	0.464 (2.044)	2.891 (8.838)	7.326 (10.80)
SH_SCHOOL	0.100 (0.139)	0.121 (0.140)	0.278 (0.210)	0.693 (0.243)	0.114 (0.129)	0.158 (0.202)	0.347 (0.257)	0.690 (0.235)
SH_HEALTH	0.0587 (0.118)	0.0784 (0.119)	0.149 (0.163)	0.217 (0.197)	0.0807 (0.116)	0.121 (0.188)	0.195 (0.208)	0.254 (0.212)
SH_WATER	0.00167 (0.0161)	0.0107 (0.0642)	0.0350 (0.114)	0.0965 (0.170)	0.0124 (0.0967)	0.0177 (0.0921)	0.0586 (0.175)	0.141 (0.186)
HH_TAP		0.00849 (0.0520)	0.0107 (0.0517)	0.0322 (0.0718)		0.0148 (0.0611)	0.0272 (0.0940)	0.0893 (0.140)
HH_WELL		0.845 (0.223)	0.848 (0.169)	0.857 (0.149)		0.816 (0.245)	0.823 (0.181)	0.747 (0.221)
HH_FOUNTAIN		0.0133 (0.0403)	0.0441 (0.0771)	0.0364 (0.0648)		0.00917 (0.0351)	0.0480 (0.0658)	0.0784 (0.116)
HH_ELEC		0.00337 (0.0192)	0.00662 (0.0269)	0.0284 (0.0754)		0.00905 (0.0414)	0.0176 (0.0557)	0.0502 (0.113)
Observations		510				138		

### 3.3 Other characteristics of the localities

The Malian censuses also provide us with individual-level data. We rely on this information to compute locality-level variables that will be used in the empirical part to predict, for each locality, its probability of being assigned to the treatment (*i.e.* of having at least one HTA registered in France over the 1987-2009 period). The list of variables is as follows:

- *POPULATION*: size of the population of the locality (in logarithm);
- *SH\_ILLITERATE*: share of the population of the locality that is illiterate;

- *SH\_AGRICULTURE*: share of the population of the locality living in a household headed by someone working in the agricultural sector.

We will also introduce two additional variables to predict the probability of treatment assignment: *RAINFALLS*, average monthly rainfall in the locality over the previous decade (1977-1987), coming from the Climatic Research Unit (University of East Anglia), and *DIST\_RIVER*, the distance to the Senegal river, the latter being a *proxy* for access to migration routes. We will also investigate whether alternative geographic characteristics influence the presence of HTAs, such as *DIST\_NIGER\_RIVER*, the distance to the Niger river, or *DIST\_BAMAKO*, the distance to Bamako, the capital city and will explore the impact of ethno-linguistic fragmentation (*ETHNO\_FRAG*) and of the proportion of the population having a job (*SH\_OCCUPIED\_POP*).

## 4 Empirical strategy and results

In what follows, we consider the presence of one or several HTAs in a given locality as a treatment variable. To identify the causal impact of the treatment on local public good provision, we account for potentially strong selection effects and use a difference-in-differences approach. We proceed in two steps: we first compare changes in local public good provision between the treated and the control localities, between 1987 and 2009. As suggested by Table 1 indeed, very few HTAs were created (and registered) before 1987. We thus exclude from our sample the 13 localities which had an HTA before 1987, and consider the 1987 and 2009 Population censuses as our baseline and endline surveys respectively. We then test the identifying assumption of the difference-in-differences approach which requires that localities with HTAs would have followed a trend in local public good provision similar to that observed in their non-treated counterparts, had they not had any HTA. To this end, we perform a first falsification test based on data from the 1976 and 1987 Malian censuses, *i.e.* at a time when no locality had an HTA. We also use the semiparametric difference-in-differences estimator proposed by Abadie (2005) to see whether our estimates are significantly altered when the distribution of the pre-treatment observed characteristics of the non-treated localities is imposed to be the same as that of the treated ones.

### 4.1 Difference-in-differences

As a first step, we estimate the following econometric model:

$$LPG_{i,t} = \alpha_0 + \delta_t + \nu_i + \alpha_1 D_{i,t} + \epsilon_{i,t} \quad (1)$$

where  $LPG_{i,t}$  is the level of public goods in locality  $i$  at time  $t$ ,  $\delta_t$  is a time fixed-effect,  $\nu_i$  is a locality fixed-effect,  $D_{i,t}$  is a dummy equal to 1 if locality  $i$  has at least one HTA in 2009 and  $\epsilon_{i,t}$  is a random, idiosyncratic error term. Locality fixed-effects capture the effect of any unobservable time-invariant locality characteristics that affect the level of public goods, as well as baseline characteristics.

Table 4 provides regression results of equation 1 using as dependent variables the provision of various types of local public goods, their distribution within localities (measured

by the share of villages endowed with the public good), and the share of households using electricity and different sources of water supply in the locality. In column (2), district (*cercle*) dummies interacted with the time dummy are added to control for other confounding factors that might explain the contrasted evolutions observed between treated and control localities over the period. The allocation of central resources to districts could be for *e.g.* systematically biased in favor of (or against) migrant-prone regions and lead us to over-(or under-) estimate the impact of the treatment. Growth patterns could also differ across districts.<sup>10</sup>

Overall, HTAs are found to make a significant and positive difference in the number of local public goods over the period 1987-2009. The estimated impact is even stronger for schools and health infrastructures when district dummies interacted with the time dummy are added to the set of regressors. On average, localities which benefit from the support of at least one HTA are found to have 4 more functional schools and 2 more water supply amenities than control localities. While the impact of the treatment on the distribution of local public goods across villages within localities is not clear, the contribution of HTAs to local public good provision translates into an increased household access to safe water through public fountains. When district dummies are not introduced (column (1)), the share of households using a tap as their main source of water is higher in the treated group, while the share of households using a well or a drilling is lower, suggesting an upgrade in water supply amenities. This effect mitigates when we introduce the subregional trends (column (2)), the share of households endowed with a tap exhibiting a p-value of 0.118. Finally, HTAs are associated with an increased household access to electricity, that is robust to the inclusion of subregional trends in the set of regressors.

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<sup>10</sup>During the period under concern, one potential source of differentiated growth patterns between localities was cotton, as Mali was by then one of the main African exporters of this crop. Production grew from 200,000 tons in 1987 to about 500,000 tons in the mid-2000s. Cotton production expanded progressively from the South-Eastern part of the country to the South-West. It then decreased as a result of falling cotton prices on the world market. We added dummy variables to control for the expansion of cotton throughout the Malian territory, but the size of the coefficient of the treatment variable was unchanged and remained significant.

Table 4: Parametric difference-in-differences, 1987-2009

Impact of having an HTA created between 1987 and 2009 on <i>LPG</i> between 1987 and 2009, With <i>LPG</i> :	(1)	(2)
SCHOOL	1.923*	4.372***
	(1.018)	(1.234)
HEALTH	0.363*	0.504**
	(0.217)	(0.233)
WATER	3.703***	2.390*
	(0.939)	(1.106)
SH_SCHOOL	-0.040	-0.004
	(0.025)	(0.024)
SH_HEALTH	-0.005	-0.011
	(0.019)	(0.015)
SH_WATER	0.038*	-0.002
	(0.020)	(0.023)
HH_TAP	0.051***	0.014
	(0.011)	(0.009)
HH_WELL	-0.082***	-0.038*
	(0.022)	(0.021)
HH_FOUNTAIN	0.046***	0.018*
	(0.010)	(0.011)
HH_ELEC	0.016**	0.026**
	(0.008)	(0.010)
Subregional trends	No	Yes
Observations	1296	1296

Robust standard errors in parentheses, clustered at the locality-level

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## 4.2 The parallel trend assumption: falsification tests

One of the most common problems with difference-in-differences estimates is the failure of the parallel trend assumption. In our case, this would mean that our variables of interest, namely local public good provision and household access to local public goods would have followed a different trend for the treated and control localities, had there been no exposure to the treatment. One way to test this identifying assumption is to perform a falsification test using time periods before the treatment, and see whether estimated changes in public good provision across treated and control localities are significant for placebo periods or not. To this end, we use data taken from the 1976 and 1987 censuses. We compute the same measures of local public good provision using the 1976 census and compare changes in local public good provision between the treated localities and the control localities, between 1976 and 1987. Due to lack of data on household access to water and electricity in the 1976 census, we are unable to test the parallel trend assumption for these outcome variables. Results on all the other variables are provided in Table 5.

Table 5: Parallel trend assumption, 1976-1987

Impact of having an HTA created between 1987 and 2009 on <i>LPG</i> between 1976 and 1987, With <i>LPG</i> :	(1)	(2)
SCHOOL	0.312 (0.236)	0.508** (0.214)
HEALTH	0.168 (0.130)	0.041 (0.152)
WATER	0.119 (0.194)	0.221 (0.220)
SH_SCHOOL	0.024 (0.016)	0.014 (0.013)
SH_HEALTH	0.020 (0.015)	-0.011 (0.015)
SH_WATER	-0.004 (0.006)	-0.002 (0.007)
Subregional trends	No	Yes
Observations	1296	1296

Robust standard errors in parentheses, clustered at the locality-level

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

As suggested by Table 5, the test supports the assumption that pre-treatment trends of outcomes were similar across treated and control localities. Whatever the specification (without district trends as in column (1) or controlling for district trends as in column (2)), changes in local public good provision are not statistically different across localities over the 1976-1987 pre-treatment period, except for the number of functional schools in column (2). In other terms, local public good provision in the treated and untreated localities followed a virtually identical trend prior to the creation of the first HTAs, which increases the confidence in our identification assumption. With regards to the number of functional schools, regression results suggest diverging trends in treated and control localities, with treated localities recording a larger increase in the number of functional schools over the 1976-1987 pre-treatment period than non-treated localities. However, the size of the coefficient is much smaller than in the previous model, which suggests that HTAs have contributed to exacerbate this diverging trend.

Another formal way to increase confidence in our identification strategy is to use the semiparametric difference-in-differences estimator proposed by Abadie (2005). This method re-weights the before and after differences for treated and non-treated localities to account for their differences in the distribution of observed pre-treatment characteristics using propensity scores. It thus compares the changes in local public good provision before and after the treatment in treated localities with those of weighted non-treated localities, so that imbalances in the distribution of covariates between both groups are accounted for and time-invariant effects are eliminated. The critical assumption now is

that, *conditional on a set of covariates*  $X$ , the treated localities would have followed a path parallel to that of the control localities had they not had an HTA.<sup>11</sup>

Formally, the estimator of the average treatment effects for the treated (ATT) is given by:

$$E\left[\frac{LPG_{i,2009} - LPG_{i,1987}}{P(D_{i,2009} = 1)} \cdot \frac{D_{i,2009} - P(D_{i,2009} = 1|X)}{1 - P(D_{i,2009} = 1|X)}\right] \quad (2)$$

where  $X$  is a vector of locality-level covariates used to predict the probability of being treated (*i.e.* of being targeted by an HTA between 1987 and 2009). Concretely, we first run probit estimations to assess the impact of locality-level pre-treatment characteristics on the probability that the locality will be treated over the 1987-2009 period. The vector  $X$  of explanatory variables includes several variables measured at the locality-level that are likely to be correlated with the propensity of people to migrate. Because we do not have any information on the socioeconomic characteristics of the localities in 1976, all the variables included as regressors are measured in 1987. The share of households headed by someone working in the agricultural sector, the illiteracy rate as well as average monthly rainfall over the 1977-1987 period are introduced as proxies for each locality's initial level of development and migration intensity. The size of the population is also introduced to account for the fact that the number of migrants and consequently the probability for a locality to have an HTA are positively correlated to its size. Lastly, geographic distance to the Senegal river is included to account for the long-lasting tradition of migration from the Kayes area which is close to the Senegal river. We also tried other regressors among which the distance to Bamako, the distance to the Niger river, the share of occupied people and ethno-linguistic fragmentation. The results of these estimations are displayed in Table 6. As expected, all the variables in our parsimonious specification (column (1)) are found to be strong predictors of the probability of being treated. This is especially true for population size, rainfalls and illiteracy rate. We then rely on the results of column (1) to predict each locality's probability of being treated. This allows us to compute its propensity score. The corrective weighting is carried out by weighting up or down the provision of local public goods among the untreated localities depending on whether covariates measured in 1987 predict a high or low probability of being treated over the 1987-2009 period.

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<sup>11</sup>While this estimator eliminates one possible cause of non parallel dynamics in average outcomes it still relies on the untestable assumption of parallel trends of average unobservables in absence of the treatment (see Abadie (2005) for more details).



Table 6: Probability of being treated

Dependent variable: HTA 1987-2009 = 1	(1)	(2)	(3)	(4)	(5)
POPULATION 1987, log	0.743*** (0.139)	0.736*** (0.137)	0.743*** (0.138)	0.749*** (0.140)	0.745*** (0.140)
RAINFALLS, average 1977-1987	-0.0563*** (0.0146)	-0.0558*** (0.0146)	-0.0567*** (0.0146)	-0.0567*** (0.0147)	-0.0569*** (0.0148)
SH_ILLITERATE 1987, %	-3.589*** (1.103)	-3.574*** (1.105)	-3.546*** (1.111)	-3.535*** (1.098)	-3.592*** (1.117)
SH_AGRICULTURE 1987, %	2.057* (1.179)	2.109* (1.203)	1.337 (1.874)	2.110* (1.188)	2.190* (1.207)
DIST_RIVER	-0.00251* (0.00143)	-0.00250* (0.00142)	-0.00255* (0.00143)	-0.00338* (0.00175)	-0.00304** (0.00153)
ETHNO_FRAG 1987		0.133 (0.482)			
SH_OCCUPIED_POP 1987, %			1.022 (2.014)		
DIST_BAMAKO				0.00176 (0.00209)	
DIST_NIGER_RIVER					0.00252 (0.00224)
Subregional dummies	Yes	Yes	Yes	Yes	Yes
Constant	(1.631)	(1.660)	(1.651)	(1.979)	(1.981)
Observations	-1.057	-1.102	-1.208	-1.825	-2.061
	647	647	647	647	647

Robust standard errors in parentheses, clustered at the locality-level

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 7 presents the results of the baseline estimation (column (1)) along with those obtained when the provision of public goods in non-treated localities is weighted according to the propensity scores (column (2)). Because we use an estimated probability to build the weights, the standard errors in column (2) are biased and we therefore only compare the size of the coefficients.<sup>12</sup> The results in column (2) are similar to our simple difference-in-differences estimates, for the provision of all public goods. Overall, the impact of HTAs on local public goods is estimated to be higher when non-treated observations are weighted, with the exception of water amenities which impact is found to decrease from 3.7 to 2.4, but remains quite strong. The implementation of the Abadie (2005) procedure leads some further support to the assumption that selection into treatment does not strongly influence our results on the provision of public goods. However, the impact of HTAs on the distribution of local public goods as measured by the share of villages endowed with each type of public goods within localities is affected by the weighting procedure. While our measures were not significantly different between treated and control localities in our benchmark specification (Column (1)), they become significant when we use the semi-parametric double difference approach. This suggests that, once differences in the distribution of pre-treatment observable characteristics between the treated and control groups are taken into account, HTAs are found to reduce disparities between villages within localities in terms of school and health infrastructures.

Table 7: Semi-parametric estimations

Impact of having an HTA created between 1987 and 2009 on <i>LPG</i> between 1987 and 2009, With <i>LPG</i> :	(1)	(2)
	Double difference	Weighted double difference
SCHOOL	1.923*	2.953*
	(1.018)	(1.616)
HEALTH	0.363*	0.558*
	(0.217)	(0.288)
WATER	3.703***	2.481*
	(0.939)	(1.393)
SH_SCHOOL	-0.040	0.152***
	(0.025)	(0.047)
SH_HEALTH	-0.005	0.038*
	(0.019)	(0.021)
SH_WATER	0.038*	-0.045
	(0.020)	(0.100)
Subregional trends	No	No
Observations	1296	1294

Robust standard errors in parentheses, clustered at the locality-level

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

<sup>12</sup>Abadie (2005) proposes a correction of the standard errors which we have not implemented yet. Thus the results of Table 7 should be considered as preliminary.

## 5 Intensity of the treatment

Over the 1987-2009 period, some localities have been much more exposed to the treatment than others, either because their HTA was created at the very beginning of the period or because they benefited from the intervention of more than one HTA. As shown in Table 2, 44% of the localities had an HTA created between 1987 and 1998. Moreover, 9.7% of the localities have more than one HTA, 75% of them being localities of the Kayes region. In what follows, we first explore the impact of HTAs after taking their date of creation into account. We then provide an analysis of the impact of the *number* of HTAs.

Column (1) of Table 8 presents the results obtained when we disaggregate the treatment into two distinct treatments: having an HTA created between 1987-1998 (the *old* HTAs) and having an HTA created between 1998-2009 (the *new* HTAs). We first look at the impact of both treatments on the provision of public goods between 1987 and 2009. The control group remains the same as in Table 4 and is composed of all the localities with no HTA in 2009. The difference in public good provision between the control and treated localities found in our baseline model seems to be mostly driven by the *old* HTAs, since their estimated impact is stronger and more significant than that of the *new* ones (see column (1) of Table 8).

In Columns (2) and (3) of Table 8, we examine in more detail the intervention of those *old* HTAs. Column (2) shows the impact of HTAs created between 1987 and 1998 on the changes in the provision of public goods between 1987 and 1998, while column (3) looks at their impact on the changes in the provision of public goods between 1998 and 2009. In both columns, the control group remains the same as before, but the sample changes since we exclude from the treated group the localities which had an HTA created after 1998. Overall, the results suggest that the impact of HTAs manifested itself most noticeably during the first half of the period, namely 1987-1998. While the coefficients reported in column (2) are positive and significant for five of our outcome variables, the estimated impact of *old* HTAs on outcomes measured during the period 1998-2009 is not significant, except for the number of schools and household access to tap water (Column (3)). Surprisingly enough, the impact of *old* HTAs on the number of water amenities (WATER variable), which was strong and significant when estimated for the whole period (1987-2009), is no longer significant when the time period is split. This last result is likely to be due to the fact that improving water access is costly and takes time, so that the impact of the contribution of HTAs in this field is only observed in the long-run.

Finally, column (4) investigates the impact of the *new* HTAs (*i.e.* registered between 1998 and 2009) on the evolution of local public goods over the 1998-2009 period.<sup>13</sup> The results confirm that most of the impact of the treatment is driven by *old* HTAs over the earlier period, since no outcome except the number of schools appears to be significantly affected by *new* HTAs' intervention. An explanation for the lack of impact of HTAs during the 1998-2009 sub-period may be the emergence over that same period of new HTAs created by Malian migrants in other countries than France. Those new HTAs might have *contaminated* the control group.

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<sup>13</sup>The sample is again different since the control group remains unchanged but the treated group now excludes the localities with an HTA created before 1998.

Table 8: Disaggregation of the treatment and its impacts at different periods of time

<i>LPG</i>	Treatment : Having an HTA created in	(1) Outcome: <i>LPG</i> in 1987-2009	(2) Outcome: <i>LPG</i> in 1987-1998	(3) Outcome: <i>LPG</i> in 1998-2009	(4) Outcome: <i>LPG</i> in 1998-2009
SCHOOL	1987-1998	4.668*** (1.233)	2.640*** (0.619)	1.901** (0.927)	
	1998-2009				2.521** (1.233)
HEALTH	1987-1998	0.891** (0.378)	1.369*** (0.512)	-0.523 (0.358)	
	1998-2009				-0.047 (0.310)
WATER	1987-1998	3.602*** (1.347)	1.219 (1.313)	1.264 (1.687)	
	1998-2009				1.822 (1.695)
SH_SCHOOL	1987-1998	0.051 (0.034)	0.065** (0.029)	-0.004 (0.031)	
	1998-2009				-0.028 (0.027)
SH_HEALTH	1987-1998	0.063** (0.027)	0.055** (0.027)	0.005 (0.016)	
	1998-2009				-0.019 (0.016)
SH_WATER	1987-1998	0.010 (0.032)	0.029 (0.022)	-0.020 (0.037)	
	1998-2009				-0.020 (0.029)
HH_TAP	1987-1998	0.017 (0.015)	0.003 (0.004)	0.023* (0.013)	
	1998-2009				0.006 (0.008)
HH_WELL	1987-1998	-0.090** (0.035)	-0.023 (0.022)	-0.047 (0.035)	
	1998-2009				-0.000 (0.024)
HH_FOUNTAIN	1987-1998	0.026 (0.018)	0.015 (0.011)	0.000 (0.023)	
	1998-2009				-0.003 (0.014)
HH_ELEC	1987-1998	0.031** (0.012)	0.004* (0.002)	0.019 (0.012)	
	1998-2009				0.017 (0.011)
Observations		1296	1142	1142	1174

Robust standard errors in parentheses, clustered at the locality-level

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

In Table 9, we provide an alternative test of the impact of the intensity of the treatment. First, we look at the impact of the number of years the locality had an HTA between 1987 and 2009 on the provision of public goods between 1987 and 2009. The results are in column (1) and suggest a positive difference between treated and untreated localities. The higher the number of years under treatment, the higher the number of schools, health centers, water amenities and the larger the share of households having access to electricity. In column (2), we focus on the second part of the period (1998-2009). The comparison of columns (1) and (2) suggests, once again, that most of the impact of HTAs manifested itself during the first half of the period (1987-1998). One exception is the percentage of households using tap as their source of water.

Finally, we look at the impact of the *number* of HTAs on the provision of local public goods. Results are presented in column (3) for the whole period (1987-2009) and in column (4) for the recent sub-period (1998-2009). Overall, those last results are found to be very consistent with the previous ones: the higher the number of HTAs intervening in a locality, the higher the number of schools, health centers and water amenities, and the larger the access to electricity. This is most noticeably the case over the 1987-1998 period. All in all, our results thus confirm the positive role of HTAs in local development. However, one should be cautious with this last bunch of estimates, as the intensity of the treatment could be correlated with some observed or unobserved characteristics of the localities.

Table 9: Intensity of the treatment

	(1)	(2)	(3)	(4)
Impact of :	Number of years under treatment between 1987 and 2009		Number of HTAs between 1987 and 2009	
On :	<i>LPG</i> measured in		<i>LPG</i> measured in	
With <i>LPG</i> :	1987-2009	1998-2009	1987-2009	1998-2009
SCHOOL	0.119*** (0.016)	0.059*** (0.013)	1.179*** (0.166)	0.582*** (0.138)
HEALTH	0.034*** (0.005)	-0.003 (0.008)	0.323*** (0.052)	0.021 (0.071)
WATER	0.089*** (0.030)	0.035 (0.041)	0.898*** (0.309)	0.519 (0.336)
SH_SCHOOL	0.001 (0.001)	0.000 (0.001)	0.006 (0.006)	0.002 (0.006)
SH_HEALTH	0.002** (0.001)	0.001 (0.000)	0.012** (0.006)	0.005 (0.004)
SH_WATER	-0.000 (0.000)	-0.000 (0.001)	-0.005 (0.005)	-0.004 (0.006)
HH_TAP	0.000 (0.000)	0.001** (0.000)	0.004 (0.004)	0.007** (0.003)
HH_WELL	-0.000 (0.001)	-0.001 (0.001)	-0.004 (0.007)	-0.007 (0.005)
HH_FOUNTAIN	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.003)	-0.003 (0.003)
HH_ELEC	0.0004** (0.0002)	0.0004** (0.0002)	0.005** (0.002)	0.004** (0.002)
Subregional trends	Yes	Yes	Yes	Yes
Observations	1296	1296	1296	1296

Robust standard errors in parentheses, clustered at the locality-level

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

## 6 Conclusion

In this article we examine the impact of migrants HTAs registered in France on the provision of public goods in Mali. Malian migrants in France gather in HTAs to send collective transfers to their locality of origin and contribute to local development. Almost one fourth of Malian localities have an HTA which potentially channels funds for the provision of public goods such as schools or health facilities. The impact of those HTAs on the local development of Malian localities is not straightforward since HTAs may complement public investment or substitute for it, hence crowding out local public funding. The impact of HTAs needs a quantitative assessment in order to determine whether the localities with an HTA are better or worse off than without.

To tackle this question, we use a difference-in-differences approach to assess the causal impact of HTAs on the provision of public goods. Using the four waves of Malian census for the years 1976, 1987, 1998 and 2009, we build a panel dataset of 648 Malian localities. For each locality, the census provides information on the provision of public goods such as schools, access to clean water, electricity and health infrastructures. This panel is merged with an exhaustive dataset that we collected on HTAs created by Malian migrants in France since 1981 and which intervention is localised on the Malian territory. We are therefore able to compare the provision of a range of public goods before and after the interventions of HTAs (1987 - 2009), in the localities with and without an HTA.

We find that HTAs tend to complement public investment, since localities with at least one HTA are better off in terms of provision of public goods than those without. In particular, over the 1987-2009 period, the localities with an HTA had more health centers and better access to clean water than the localities without HTAs. The share of households with electricity was also higher in localities with HTAs. These results are robust to two falsification tests, aiming at controlling for the potential selection into the treatment.

However, the impact of HTAs on the provision of public goods manifested itself most noticeably during the 1987-1998 period, before the decentralization process turned into the creation of municipal councils. Those municipal councils are endowed with a certain amount of financial autonomy. Our econometric results suggest that neither the HTAs created before 1998 nor those created afterwards had any impact on the provision of public goods on the 1998-2009 period. This result may suggest that, while the first generation of HTAs did contribute to local development, some mechanisms have prevented the more recent HTAs to do so. This evolution may be due to the catching up of the *control* localities thanks to the decentralization process or to an evolution in the nature of the intervention of HTAs since the reform. To disentangle these different processes, a detailed investigation of the political mechanisms at work is needed that is outside the scope of this article.

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