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Statistics Iceland, Demography and census

## Census in Iceland 2011

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*Summary* As all other countries in the European Economic Area, Statistics Iceland will conduct a census in Iceland in the year 2011. In this short paper the planned census will be briefly described, but the main focus will be on the question of how to link addresses, dwellings and persons, with some fleeting mention of businesses. This link is the key to a successful census operation. Several strategies will be discussed for reducing the field work or manual linking by making use of existing relationships in the databases that in the care of Statistic Iceland.

### Past Icelandic censuses

As all other countries in the European Economic Area, Statistics Iceland will conduct a census in Iceland in the year 2011. In this short paper the planned census will be briefly described, but the main focus will be on the question of how to link addresses, dwellings and persons, as well as businesses and addresses. This link is the key to a successful census operation.

*Oldest modern census* The history of censuses in Iceland is long, but somewhat broken. The first modern census was conducted in 1703, which also happened to be the first modern census in the world covering a whole country. This is at least what Icelanders hold true, for sure the Danish authorities at the time only considered this as a partial census, covering three “*Amts*” in the kingdom of Denmark and Norway. Regular full censuses, however, did not start in Iceland until 1835. These continued unbroken until 1960, first with 5 year intervals, but from 1860 every ten years.<sup>1</sup>

In 1952-4 the Icelandic National Register of Persons (NRP) was established by Statistics Iceland with a special census in October 1953, complementing the 1950 census. All the census records were entered into punch-cards for machine processing. These records were updated yearly, and later quarterly and monthly, until 1968 when they were transferred unto tapes. This continued until 1986 when the NRP became current and updated on a daily basis.<sup>2</sup> The mechanisation of the NRP enabled annual complete statistics on the population by sex, age, residence and marital status.

<sup>1</sup> Statistics Iceland: *Mannatal á Íslandi 1. desember 1950*. Reykjavík 1958.

<sup>2</sup> Hallgrímur Snorrason: *Endurskipulagning Þjóðskrár*. Erindi á fundi Skýrslutæknifélags Íslands 1. október 1985, <http://www.hagstofa.is/Pages/1525>, extracted 7 May 2009.



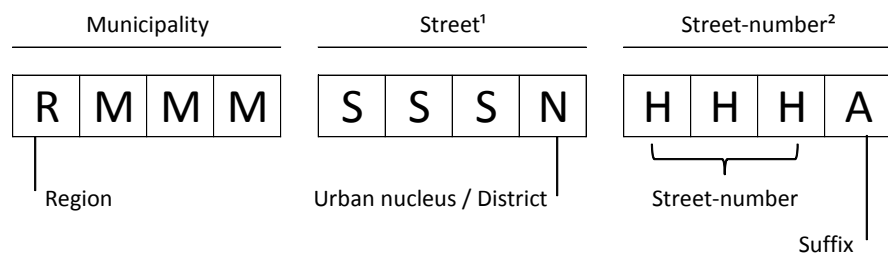
The importance of taking a decennial census was greatly diminished with the mechanisation of the NRP. In 1969 Statistics Iceland believed, too optimistically as it turned out, that new technology and the new Business Register would obviate the traditional census.<sup>1</sup> No census was thus taken in 1970. Useful information about the occupation of the people was, however, not to be gleaned from the Business Register. The plans for a fully electronic census had to be postponed indefinitely, but in the meantime a traditional census was taken in 1981. No means, however, were found to conduct a census in 1990 and none in 2000, as the development of personal register statistics apart from the demographic registers proved to be too slow and a successful registered based census thus too costly.

In late 2007 Statistical Iceland deemed that the time was ripe for attempting to connect the various dots. Although the registers on the business side are still not in a good shape, developments in sampling surveys, such as the LFS and the SILC, and especially in the Property Register, allow Statistics Iceland to focus on the linkage between persons and residences. Linking the National Register and a register of dwellings will enable statistics on households, families and dwellings, which is the key element currently missing in the Icelandic statistical system. Data on education and occupation is still incomplete in the registers, but can be imputed by using large sample surveys.

### Current state of address information in the NRP and the Business Register

The current format of the NRP address only allows for identifying the street address. The address code or identifier is a numeric code of 12 digits that are grouped together in three main components. All three components are loaded with information, which makes the code volatile and susceptible to changes. Figure 1 shows how the code is constructed.

**Figure 1. The Address Identifier in the National Register of Persons**



<sup>1</sup> SSS=999: Rural

SSS=000: Unspecified

<sup>2</sup> In rural areas the 4 digit code refers uniquely to each farm or dwelling.

*The Address Code scheme has burst*

Due to merging of municipalities, especially in the 1990s, as well as procedural changes in some municipalities, the sub-component information is no longer reliable. Municipalities have, e.g. merged across regional boundaries, they have consolidated resulting in more than 10 urban nuclei or districts, and some

<sup>1</sup> Frv. til laga um fyrirtækjaskrá, greinargerð, þskj. nr. 517, Lagt fyrir á 89. löggjafarþingi, 1968-69, see also preface to Statistics Iceland: *Mamtal á Íslandi 1. desember 1960*. Reykjavík 1969.

municipalities have started to add a suffix to street-numbers outside the range a-j, wreaking havoc to that part of the code.

The total number of distinct address codes in the NRP on 1 January 2009 was 64.009. In contrast, the total number of code-changes from 1986 until 1 January 2009 is 23.354.<sup>1</sup>

#### *The Business Register*

The NRP was founded as a division within Statistics Iceland but transferred to the Ministry of Justice in 2006. The Icelandic Business Register was also founded by Statistics Iceland in 1969 and remained there as a unit until the Inland Revenue Service received the unit in 2003. For some reason it was decided not to code the addresses of businesses in the same way as those of individuals. In fact it was decided not to code the addresses at all, but to register the addresses of businesses as a free and open alphanumeric text field. The only nod towards the NRP was to also register the 4 digit code of the municipality.

On 1 January 2009 the number of distinct addresses in the Business Register was 40,695.<sup>2</sup> These addresses have not been analysed, but it is suspected that the list includes relatively high number of spelling variations as well as other non-standard addresses.

In short, it is the opinion of Statistics Iceland that it is high time to move from the current system of address codes towards a more rational, non-informational system of distinct and fixed address identifiers. The current project of establishing the Icelandic Address Register, lead by the Icelandic Property Registry, thus enjoys the full and unstinted support of Statistics Iceland.

### **Matching persons and dwelling units**

Matching persons and dwelling units is the key to a successful register based population and housing census in Iceland. Without it, no information can be gleaned about households, families or housing – in short, without this match no census can be taken in 2011.

For this task Statistics Iceland is dependent upon the active cooperation of the National Registry, and of the Icelandic Property Register. The first maintains the information about persons and their abode, while the latter maintains information about dwelling units and addresses.

The matching of persons and dwelling units can be seen as a twofold task. First the matching of street addresses. Second, the matching of persons and dwelling units attached to those street addresses.

#### *The address matching is underway*

The matching of street addresses in the various register is currently underway, as part of the development of the Central Address Register. The National Registry has also started work on adding a dwelling unit identifier to the current address information of the individuals.

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<sup>1</sup> Datafiles at Statistics Iceland. Own extractions. Active businesses or associations with registered address in Iceland at the end of the year.

<sup>2</sup> Datafile at Statistics Iceland. Own extraction.

There are many practical issues involved in coordinating the work of the different agencies, ensure the cooperation of the population and municipalities, and carry out the effort. The following will, however, mostly ignore those. Instead the paper will focus on estimating the scope or size of the task and discuss general strategies for tackling it.

### **Linking of street addresses of the NRP and of the Business Register to the Address Register**

*Only the text string of addresses can be matched*

With the reorganisation of the Icelandic Property Register (IPR) in the 1990s it was decided to move away from the address code of the NRP, as these were deemed too unstable for use as an identifier for real property. The codes had been kept as a part of the registration, but had slowly started to diverge due to maintenance issues. The only feasible strategy for linking of the two registers is thus to make it on basis of the text string of the street address, as well as with information about the municipality and/or postal area.

Tests for such a linking have already been carried out by the staff of the IPR charged with developing the Address Register. A match was found for 96% of the cases for one municipality (*Fjallabyggð*), with obvious strategies for further modification of the matching algorithm that may nudge the match rate up to 99%.<sup>1</sup> Even if these results cannot be generalised for the whole country<sup>2</sup>, it should not be too costly to manually look up the failures. After all, each percentage only represents about 640 street addresses.

The linking of street addresses in the Business Register would follow the same procedures. Here, however, the state of the addresses is poorer, which would reduce the number of hits. No tests have been conducted in order to assess how many addresses would have to be manually linked. For the purposes of the census only a small part of these, however, have to be converted as relatively few employ any staff.

### **Identification of apartments**

The current legislation on addresses and domicile of individuals does not envisage the registration of individual apartments within the street address. The law nevertheless empowers the respective minister to issue an administrative regulation for that purpose. This regulation has never been issued. In 1992 a special committee was charged with drafting such a regulation. This was abandoned as it was assumed that the then new project for establishing the central Property Register would subsume this task.<sup>3</sup> That, however, did not happen.

In late 1990s a field was added to the Change of Address form. This was especially for the purpose of identifying individual dwelling units within housing complexes.

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<sup>1</sup> E-mail from Tryggvi Már Ingvarsson, 9 December 2008.

<sup>2</sup> E-mail from Tryggvi Már Ingvarsson, 3 June 2009 indicates that 87% of the NRP addresses can be matched directly with addresses in the Address Register. Better results could be achieved by further tweaking the algorithms.

<sup>3</sup> Internal memoranda at Statistics Iceland.

In spite of this, the NRP does not code this information.<sup>1</sup> Other forms that are also used for notifying addresses, e.g. marital forms, applications for residence permits, were not changed.

**Figure 2. The Dwelling Unit Field (Flat) in the Change of Address Form**

Notification of change of address in Iceland			
Information should be submitted to the relevant Council Chairman's office or a police station.		Change of address must be notified within 7 days	
Please fill in clearly			
Moving (day, month, year)			
Address	Address (street/house, house number)	Flat (number/floor) if applicable	Municipality
Address	Address (street/house, house number)	Flat (number/floor) if applicable	Municipality
For all persons moving together	Full name	Identification number	

*Dwelling identifiers are provided by the movers*

In the summer of 2008 the author examined whether or not information written on the forms could be referred to in lieu of a field trip, in case Statistics Iceland started to allocate the population to individual dwelling units. The author concluded that the whether or not the information was entered on the form – only moves to multiple housing buildings were studied – was likely to be affected by whether or not the personnel of the NR assisted the person. The NRP personnel know that the information will be ignored so forms filled out at the premises of the NR are less likely to contain this information. Otherwise up to 90% of the forms examined contained dwelling unit information, and 83% in total. The quality of the information is, however, somewhat lacking, with 10% of the total not usable, even if filled in.<sup>2</sup>

*The traditional scheme for identifying dwelling units*

Identification of apartments in multiple housing buildings is traditionally so that the level immediately at or above ground level is identified as the 1<sup>st</sup> floor and the level immediately below ground level is identified as the basement (*kjallari*), but sometimes – especially by real estate agents – as ground level. Floors that are partly directly under the roof with the roof reducing the living space are referred to as the loft (*ris*). When apartments are only one to each floor, these are referred to by the floor number, the basement or the loft. Otherwise dwelling units are generally identified by reference to the level plus the left hand or right hand side, depending on where you stand in front of the main entrance. In big apartment houses, where there are more than 3 apartments per floor, these are then numbered or a letter assigned to each apartment, not always with the same starting point for the sequence.

Apartments, as well as self-contained spaces in the IPR, are identified with a four digit code, the first digit referring to the floor (the first basement level with 00), and last two digit referring to the sequential number of the apartment (self-contained space) in clockwise order starting from the left (as seen from the main entrance). This code may conflict with the actual local situation/tradition, both with regard to the floor number and the apartment number. It has nevertheless become widely used, especially in real estate business.

<sup>1</sup> This is not altogether true, as in few cases where two persons with the same name live at the same street address, but different dwelling units, the NR has issued separate address codes to these persons. The last digit of the 12 digit address code will then be changed, and the text information will contain the 4 digit dwelling unit identifier as well as the street and street number.

<sup>2</sup> Ómar Harðarson. *Athugun á tilkynningum um flutning í sambylishús 2007*. Report. 8 July 2008.

## Strategies for linking apartments and persons

Statistics Iceland can estimate the number of households from the Survey of Income and Living Conditions (SILC). This estimate gives approximately 122,000 private households in Iceland on 1 January 2009 with 2.52 persons on the average per household.<sup>1</sup> At the same time (31 December 2008), there were roughly 129,000 dwelling units registered in the IPR (cf. Table 1).

**Table 1. Number of dwelling units by type of building and region, 1 January 2009**

	Total	Capital region	Other regions
<b>Total</b>	<b>129,366</b>	<b>79,596</b>	<b>49,770</b>
Single apartment buildings	51,629	21,107	30,522
Double apartment buildings	12,916	7,482	5,434
3-5 apartment buildings	15,978	12,743	3,235
6-12 apartment buildings	24,734	19,741	4,993
13 or more apartments in building	22,684	17,829	4,855
Dwelling units in non-residential buildings	1,425	694	731

Source: Icelandic Property Registry, [www.fmr.is](http://www.fmr.is), extracted 5 May 2009

In 1997/8 Statistics Iceland tested what it took to link up persons and apartments in one municipality (*Selfoss*) outside Reykjavik. This was done manually and without any clever programming at all. It turned out that 6 minutes were needed for finding a dwelling for each person.<sup>2</sup> If this were extended to the approximately 320,000 persons currently registered with domicile in Iceland, we would need almost 18 persons working diligently for one year to achieve this.

That would not be very sensible, as immediately afterwards Statistics Iceland found out that very simple algorithms would have correctly linked 71% of the population of *Selfoss* to their dwelling unit.<sup>3</sup> This estimate is probably too optimistic for the country as a whole as owner-occupied dwellings are 88% of the total in this municipality compared to 80% for the whole country.<sup>4</sup> On behest of Statistics Iceland the staff of the Property Registry extended the matching algorithm to the total population, and managed to match 63% of the population to a particular dwelling unit.<sup>5</sup> Matching 63-71% of the population to dwelling units amounts to approximately 5-6½ persons working for one year on finding dwelling units for the remaining population. That is a considerable saving, compared with the 18 persons required by using the brute force method.

There are possibilities of achieving even better results. The following lists the key strategies that seem to be feasible:

*Start recording the dwelling unit immediately*

<sup>1</sup> Statistics Iceland. Internal communication.

<sup>2</sup> Verkefnishópur um landeignaskrá: *Tilraunaverkefni á Suðurlandi 1999-2000*, Report October 2000.

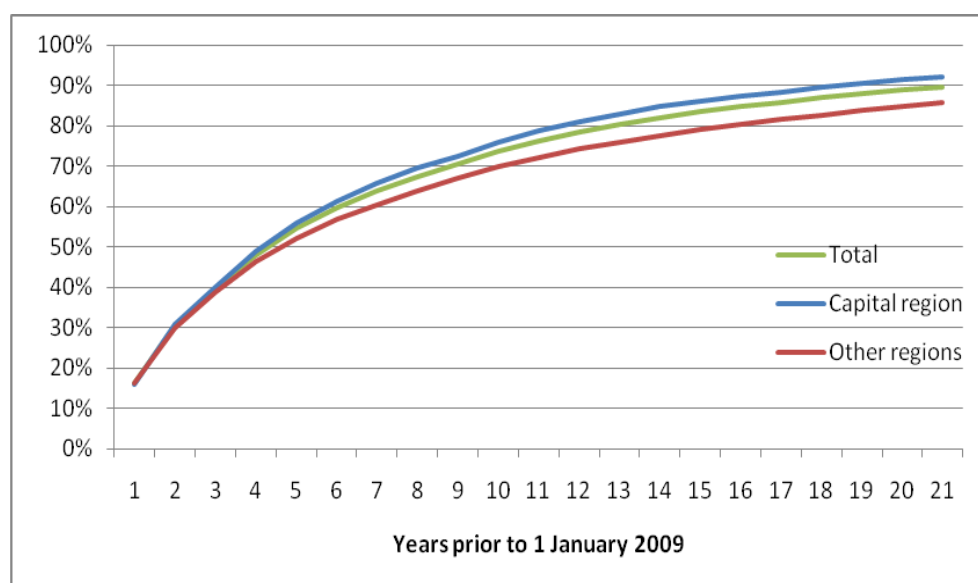
<sup>3</sup> Verkefnishópur um landeignaskrá: *Tilraunaverkefni á Suðurlandi 1999-2000*, Report October 2000.

<sup>4</sup> Statistics Iceland, the average of yearly data from the Household Budget Survey 2000-2007. Internal communication. The owner occupancy rate could be overestimated, considering low response rate of 1 person households which might have higher percentage of lessees, data from end of year 1996 are not available.

<sup>5</sup> Verkefnishópur um landeignaskrá: *Tilraunaverkefni á Suðurlandi 1999-2000*, Report October 2000.

- It is feasible for the NRP to start registering apartment number when changing or notifying address, and just wait. This will over time link everybody to a particular apartment, but only at the “natural” migration rate. The current rate is shown in Figure 3. Approximately 16% of the current population moved house or notified address in 2008, 30% in the past two years, 40% in the past 3 years and approximately 55% of the population 1 January 2009 moved house at least once in the past 5 years. There is, of course a “die hard” population that has stayed put for the past 21 years and never moved.

**Figure 3. The Percentage of the Population 1 January 2009 That Have Moved in the Past Years by Region**



Source: Statistics Iceland, calculations from the log-event register

If the registration of dwelling units were to be started immediately, a already between 30- 35% of the problem would thus be taken care of by the end of 2011. Instead of 5 workers slaving away at linking the flats and persons, we would thus get by with only 3-3½.<sup>1</sup>

The estimate above, of course assumes, that it is equally difficult to place the “die hard” non-movers as the movers. That is of course not true, those who have never moved in the past 21 years are disproportionately living outside of the capital region, where you have also disproportionately fewer multiple housing buildings. This can be clearly seen when Table 1 and Figure 3 are studied together.

#### *Identify the family*

- The algorithms that were tested in 1998 and 1999 were fairly simple. If the dwelling unit was in a single apartment building, all persons registered there would be assigned to that dwelling unit. For multiple apartment buildings, the “nuclear family” (father + mother + children under 16) was linked with the list of apartment owners. If there was a match on the personal identity number of at least one person as well as the street address, the whole nuclear family would be attached to that apartment. These algorithms can be made more sophisticated. Children that are 16

<sup>1</sup> There are obvious quality problems associated with starting to register dwelling units. These will be addressed to some degree below.

years or older (now the age limit is 18 years) can be linked again to their parents, and by judicious use of lists of parents and spouses, a whole bunch of more distant relatives (grandparents and cousins and nieces) can be identified as a family unit and linked together with the apartment owner to the apartment. Such an exercise is done on a regular basis in the survey department of Statistics Iceland in order to match with telephone numbers. This would reduce the remaining unlinked population by approximately 8% of the total population,<sup>1</sup> which would in turn save the work of 1½ person linking the population and dwellings manually.

*Add known renters to owners' list*

- Ownership of apartments is very prevalent in Iceland, or around 80%. The rest either rents or lives in apartments for free or as part of their work agreement. Part of the operation of the Property Registry is to officially record or notarize legal agreements. Rental contracts are often recorded and approximately 11,000 such were linked to a particular house or an apartment in April 2008, according to the IPR<sup>2</sup>. If this list is added to the list of owners, then additional 6-8% of the population could possibly be attached to an apartment by imputation. That would save the work of about 1 person for up to 1½ year.

*Get information from big landlords*

- Rental housing in Iceland is to large degree operated by public or semi-public landlords. These operators can easily be found and should be able to provide lists linking lessees and apartments. By the end of 2008 slightly less than 16 thousand individuals, companies or public entities owned a part in more than one apartment, with the 100 biggest owning approximately 9% of the total housing stock.<sup>3</sup> When leasing from public or semi-public agencies the lessees are not required to notarize the contract in order to get lease benefits from the municipalities. This list would thus add new lessees to the list of recorded rental contracts provided by the IPR. A guesstimate would be that approximately additional 2-3% of the population could be placed in a dwelling unit, thus reducing the work of manually attaching persons to dwelling units by some months.

*Look up in the census 1981*

- For those who have not moved since the traditional census in Iceland 1981 some additional information about the dwelling unit can be found from these data. As these persons are fewer than 10% of the total and may already have been allocated to dwelling units by other means, the gains from this strategy can be expected to be marginal at best.

*Analyse past moving history*

- Finally, the past moving history is telling for which persons live together in the present. If two persons move on the same day from the same address to

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<sup>1</sup> The expected number of persons that can be linked to a particular dwelling unit can be expressed by the model  $N_p = M(1 - V)(H_1 \bar{h} - H_n O \bar{K})$  where  $M$  is the match rate for addresses,  $V$  is the vacancy rate,  $H_1$  is the number of single apartment buildings,  $\bar{h}$  is the average household size of private households,  $H_n$  is the number of apartments in multiple housing buildings,  $O$  is the owner occupancy rate, and  $\bar{K}$  is the average size of the nuclear family. Estimations of the various terms of the model can be found in the main text, with the exception of  $\bar{K}$ , which is currently 1.84. Applying the model to the 1 January 2009 population and housing stock will yield an allocation rate of 70%. Increasing  $\bar{K}$  to 2.3 (expected size of the family groupings that can be achieved by making use of family information as mentioned in the main text) would result in an expected allocation rate of 78%.

<sup>2</sup> IPR: Reply to an e-mail request 22 May 2008

<sup>3</sup> Data from the IPR,



a common address, but are not otherwise linked, it is fairly safe to assume that they are presently living in the same apartment. While this can lead to errors, such errors are probably small enough for the purposes of the census, even if the errors would be unacceptable for the National Register. There is no way to estimate without further tests how much this would improve previously mentioned strategies. The best guess is, however, not by very much.

By the strategies listed above, it may thus be possible to programmatically assign a dwelling code to over 90%, even over 95%, of the population. If successful, relatively small amount of work would be needed to manually link the persons and dwelling units. According to the estimates above, it would require the work of 1 person for little more than a year.

## Registration of dwelling units

It is fairly straightforward to change the programs for the NRP and add an item for the dwelling unit. It will be somewhat more complicated to implement the link with the Address Register and all the lookups and verification rules that are involved. This is, however, outside the scope of this paper, being the responsibility of the National Registry in cooperation with the Property Registry.

*Affixing signs  
to each door*

The reliability of the registration, however, is of some concern for the census operation. In other Nordic countries it has been recognised that the dwelling unit identifier should be affixed to the door of the dwelling unit, in order to reduce the registration error due to the lack of knowledge of the person.<sup>1</sup>

It would be costly to produce and distribute such signs. The benefits are also not necessarily such that it would improve the data. All or most dwelling units have some informal identifier *in situ*. It may be obvious from the arrangement as seen from the main entrance, and in large complexes, each unit has an identifier, most often referring to the floor number and the sequence within the floor in some alphanumeric form. The problem is thus not that it is impossible to refer to the dwelling unit when notifying the change of address. The problem consists solely in the correspondence of this local or informal identifier with the code that is used in the central register.

Producing and affixing signs to the doorposts may be one way of solving the correspondence problem. Adjusting the register to take the local identifiers into account, where there is divergence, might be a more relaxed and cost efficient approach in the long run.

*Error rates without signs are  
probably manageable*

In order to assess the scale of the problem it is possible to look at the correction rate for the registration of addresses in the NRP. Between 1991 and 2008 this rate was about 1.4%. Two large municipalities (*Akureyri* and *Reykjanesbær* – previously *Keflavik*) have implemented an address system, so that each dwelling unit in multiple apartment buildings has a separate street address (street number + suffix). As expected, the correction rate is higher for *Reykjanesbær*, 2.5%, while

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<sup>1</sup> See e.g. discussion in Statistics Norway. *Folke- og boligtellinger i Danmark og Finland*. Rapport fra en studietur 1.-4. desember 1997.

the municipality of *Akureyri* is below the average with a correction rate of 1.2%.<sup>1</sup> Why fewer corrections are made in the *Akureyri* than on the average is not known, but it could be related to the fact that it is one of two municipalities in Iceland that register address changes independently from the NRP. The other municipality (*Vestmannaeyjar*) has also an average correction rate of 1.2%. Local knowledge may thus be helpful in reducing the number of registration errors.

If we assume that registration into dwelling units would cause the average correction rate to double, the consequences for the operation costs of the National Registry would nevertheless be minimal. In 2007, 41.103 distinct moves were registered to an address in Iceland.<sup>2</sup> If the additional correction rate is 1.4% and 20 minutes spent on correcting each wrongly registered move, then the additional work would sum up to little more than one month of work.

## The housing stock

A census has two parts. The census that will be conducted all over Europe in 2011 will be a Population and Housing census. This entails that it is not sufficient to link persons to housing in order to place them and provide some extra details to the snapshot picture that is taken of them. The housing itself will be an object for counting and analysing.

The Icelandic Property Register is the main source for the census of the housing stock. It cannot, however, be the only source. In addition, there are other housing units that are not registered as such in the IPR, but which are occupied according to the NRP. Most of these are already registered in the IPR, but not identified as dwelling units. There seem to be three main types of such housing:

1. Units, which are subdivided from an existing dwelling unit. These could entail extra apartments that have been constructed, or rooms that are let.
2. Units that are converted from industrial or commercial units. In all cases these units would not be formally accepted as dwelling units.
3. Unconventional dwelling units, summer cottages, mobile homes etc.

The first category can be to some degree estimated from the data on lessees, which were discussed above. The second may to some degree be found by examining the change of address forms. In some cases, municipalities accept registration in these dwelling units, in other cases, the NRP is forced to register the persons with "Unspecified domicile". The third category is mostly unknown and difficult to ascertain in a housing census based on registers.

Statistics Iceland is contemplating soliciting the assistance of health and safety authorities, especially the fire departments, for discovering occupied but non-registered housing. Statistics Iceland is, however, yet to discover ways to estimate the characteristics of the dwelling units that are not registered as such in the IPR.

It should be noted that the unconventional dwelling units put an upper limit on what can be achieved by automated linking of persons and dwelling units discussed above, especially with regard to categories 2 and 3. In case of the first category of

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<sup>1</sup> Statistics Iceland, own extractions from the log-event register of the NRP. The correction rate has generally gone up, but that may be due to increased number of immigrants.

<sup>2</sup> Statistics Iceland. *Búsetuþróun 1988–2007*. Statistical Series 2009:2, 26 March 2009.

subdivided units, the algorithms will allocate all persons at the address in question to the same main dwelling unit, thus causing an overfit error.

## **Conclusion**

This paper described the current address scheme in use for population statistics and the recording of the domicile of persons in the National Register of Persons. The paper then focused on the strategies that Statistics Iceland will implement, not only in converting this scheme to a new Address Register, but also for linking the population to the individual dwelling units. By the use of a multifaceted strategy, it is expected that this linking can be done electronically for the most part with relatively small amount of manual work or field work needed.

The current address code scheme in the NRP is out of date, not to consider the Business Register. These should be replaced by a modern scheme where addresses are registered and maintained independently from the characteristics of persons or legal entities. Statistics Iceland sees the development of an Address Register as the key for linking the records of various registers to housing and places. Without this, Statistics Iceland will not be able to fulfil its obligations of carrying out a census in 2011.

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*The views set out in this paper are that of the author and should not be construed to necessarily express the position of Statistics Iceland.*

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