Summary

In the 2010 census round, Austria conducted the population census completely by using administrative data sources. Household and family statistics as part of the population census include information about types of households and families, as well as the specific status of a household and family member respectively. I will describe a framework, developed by Statistics Austria for the register-based census 2011, to generate family statistics from administrative data sources. The approach is based on data of relationships and how to handle them. Therefore, we combined algebraic, graph theoretical and statistical tools to construct a general framework. It is planned to also apply this procedure with certain improvements for the 2020 census round.
I. Introduction

1. The Austrian register-based census act of 16th March 2006 (cf. [6], § 7 (1)-(4)) stipulated that the 2011 census of population and housing and the following decennial censuses should be conducted by using administrative data sources. Such register-based statistics have a long tradition in the Nordic countries (see [8]) and hold several advantages in comparison to classical surveys. For example, such a procedure is very cost efficient and there is no respondent burden anymore. On the other hand such a kind of census is a challenge in statistical methodology, i.e. data editing, coding variables, matching and deriving attributes and finally estimating missing values or objects. For a description of the Austrian Census 2011 see [3]. A general description of the register system and the methodological work can be found in [9].

2. As part of the Austrian census 2011 household and family statistics have been generated completely by administrative data sources. Creating such statistics from administrative registers only leads to several challenges. In a traditional census each member of a household has to fill out a questionnaire, which includes queries about the household status (e.g. husband, wife, etc.). Using that information the type of household can be derived. For example if each person in a household states that he/she is not related as couple or parent/child to any household member, then the type is a non-family household. In a register-based census the absence of family-relationships is not a sufficient criterion for a non-family household.

3. Furthermore, a household with at least three persons can become implausible because of incorrect relationships (e.g. two partnership relations in a three person household). In summary, the challenge in household and family statistics is to detect implausible households and to estimate missing relations.

4. The purpose of this paper is to describe abridged the framework for family generation via relationships developed by Statistics Austria for the register-based census 2011 (a more detailed description is given in [5]). It is planned to apply this procedure for the 2020 census round. Of course, the imputation quota will be improved by historicising data on relations. But, as we see from the experience of the 2011 census, some slight modifications of the approach are meaningful improvements. At present, this modified framework is used to produce annual household and family statistics starting on reference day 31 October 2012, as part of the Austrian Register-based Labour Market Statistics. These modifications will be outlined. For further improvements, Statistics Austria has planned for the next census 2021 to include a new data source - the new Austrian central civil status register (which was established at the ministry of interior in the year 2014, see [4]).

5. As preparation, Section II explains some basic definitions on households and families. After that I describe the available data, in particular the data about relationships. In Section III, I look at the household level and show how plausibility is checked. Additionally, there is a brief description of an imputation process for relations. Section IV finishes by a discussion on improvements for the considered statistics.

II. Preparations

1. Family nucleus

6. Since we focus on a register-based census, a household is defined by the household-dwelling concept (see [7]), i.e. we consider all persons living in a housing unit to be members of the same household.
7. The term *Child* refers to a blood, step- or adopted son or daughter (regardless of age or marital status) who has usual residence in the household of at least one of the parents, and who has no partner or own child(ren) in the same household. Foster children are not included.

8. A *family nucleus* is defined as two or more persons who live in the same household and whose relationship is defined as either married or cohabiting partners, or as a registered same-sex couple, or as parent and child. For these definitions and further information on households and families we refer to [7].

2. Data sources

9. To derive a family nucleus, information on households, demography and relationships are needed.

10. Households in the Austrian census are generated by linking the Central Population Register (CPR) with the buildings and dwellings register (BDR). These registers contain the same addresses (numerical codes) for buildings, but not always the same information on the dwelling (numerical code for the dwelling and/or door number). The BDR is highly reliable on the building level. As far as dwellings are concerned, the linking of dwellings with people registered in the CPR is less successful due to some missing or wrong door numbers. In these remaining cases (about 1.9% of the Austrian population) additional sources are used to generate households, e.g. relationships. The statistical accuracy of household generation by registers is treated in [10].

11. The demographical information we need are sex, age and marital status. Further, a variable *age at registration* is needed, which can be derived from the date of registration in the CPR and the date of birth. The basic data sources for relationships are:

- Central social security register (CSSR)
- Child allowance register (CAR)
- Tax register (TR)

12. The variable relationship occurs in more than one register (it is a so called multiple attribute). In the CSSR, people who are co-insured through a family member's national health insurance are included. The kind of co-insurance implies the type of relationship. The CAR contains information about the parent-child relations for children up to 18, or if they are students, up to 25 years of age.

13. Under certain conditions (e.g. if you receive child allowance) you can request tax allowance by the federal ministry of finance. Parts of these records can be used to derive relationships.

3. Relationships

14. Statistics Austria uses the following types of relationships:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cou</td>
<td>couple relation (married or cohabiting partners or registered same-sex couple)</td>
</tr>
<tr>
<td>P-C</td>
<td>parent-child relation</td>
</tr>
<tr>
<td>Sib</td>
<td>sibling relation (full-, half-, step- and adoptive-siblings)</td>
</tr>
<tr>
<td>Gp-Gc</td>
<td>grandparent-grandchild relation.</td>
</tr>
<tr>
<td>0</td>
<td>no relation</td>
</tr>
</tbody>
</table>
15. A relation from a person $p_1$ to a person $p_2$ is denoted by $p_1 \rightarrow p_2$. The opposite relation is denoted by $p_2 \rightarrow p_1$. The opposite of the directed relation $P$-resp. $Gp$-resp. $Gc$ is denoted by $C$-resp. $P$-resp. $Gc$-resp. $Gp$. There is no extra notation for the opposite of the undirected relations $Cou$, $Sib$ and $0$. The set of relations and their opposite relations is denoted by $R$.

16. Obviously, a valid relation requires two different persons and between those the relation has to be well-defined, i.e. exactly one type of relationship can be valid. Hence, one has to define rules for plausibility for each type of relationship. To illustrate this process of data preparation, it is briefly described here. Depending on the type of relation $\geq$ it must satisfy certain requirements on sex, age and marital status, respectively.

17. As an example, Statistics Austria uses the following rules to check a $Cou$ relation $p_1 \rightarrow p_2$ between two persons $p_1, p_2$ with age $a_1, a_2 (a_1 \geq a_2)$, sex $s_1, s_2$ and marital status $m_1, m_2$, respectively.

18. A relation from a person $p_1$ to a person $p_2$ is denoted by $p_1 \rightarrow p_2$. The opposite relation is denoted by $p_2 \rightarrow p_1$. The opposite of the directed relation $P$-resp. $Gp$-resp. $Gc$-resp. $Gp$. There is no extra notation for the opposite of the undirected relations $Cou$, $Sib$ and $0$. The set of relations and their opposite relations is denoted by $R$.

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20. As an example, Statistics Austria use the following rules to check a $Cou$ relation $p_1 \rightarrow p_2$ between two persons $p_1, p_2$ with age $a_1, a_2 (a_1 \geq a_2)$, sex $s_1, s_2$ and marital status $m_1, m_2$, respectively.

Table 1  
Rules regarding demography

<table>
<thead>
<tr>
<th>sex</th>
<th>age</th>
<th>marital status</th>
</tr>
</thead>
<tbody>
<tr>
<td>$s_1 \neq s_2$</td>
<td>$a_2 \geq 16$</td>
<td>$m_1, m_2$ are opposite sex partner</td>
</tr>
<tr>
<td>$s_1 = s_2$</td>
<td>$a_2 \geq 18$</td>
<td>$m_1, m_2$ are same sex partner</td>
</tr>
</tbody>
</table>

21. If the relationship does not comply with those rules, it will be deleted.

22. In the Austrian census 2011, a relation between $p_1 \rightarrow p_2$ was deleted if not all sources were consistent regarding the relation type. As an improvement for the next census 2021 new rules are developed to keep one of these (multiple-type) relations (e.g. we favour relation types according to their number of sources or by their last statistics-relevant delivery date). This affects about 0.1% of all relations.

23. The final step to prepare relationships is to derive new relations $p_1 \rightarrow p_3$ with the help of existing relations $p_1 \rightarrow p_2, p_2 \rightarrow p_3 (p_1, p_2, p_3$ pairwise distinct persons). Here it is crucial that the relationships are archived (Statistics Austria has been collecting data on relationships since 2006). This can be important if the persons $p_2$ do not live in the same household as $p_1$ and $p_3$. This derivation goes beyond the census population level.

24. That way, Statistics Austria obtained over 9 million relations for the register-based census 2011.
III. Household level

1. Households and graphs

25. Let \( n \in \mathbb{N} \). A (abstract) household \( H = (P, R) \) is a non-empty finite set \( P = \{p_1, p_2, \ldots, p_n\} \) of persons together with a set of relations \( R = \{(p_i \rightarrow p_j) \in R | 1 \leq i < j \leq n\} \).

26. To a household \( H \) we assign a simple graph \( G_H \) by taking \( P \) as the set of vertices and \( \{r \in R | r \neq 0\} \) as the set of edges. A relation \( p_i \rightarrow p_j \) induces a direction and a label (the type of relationship) to the corresponding edge.

27. Since the labels \( Cou \) and \( Sib \) do not change if we reverse the direction, we skip their direction.

28. Hence \( G_H \) is a simple, (partially) directed, labeled graph.

29. **Definition.** A household \( H \) is called (weak-) connected if \( G_H \) is connected. A household \( H \) is called strong-connected if the subgraph of \( G_H \) with the set of edges \( \{r \in R | r \in \{Cou, P-C, C-P\}\} \) is connected. In particular, a one person household \( H = (\{p_1\}, \{\}) \) is strong-connected.

2. Algebraic structure of relations

30. We wish to define an operation \( \circ \) on \( R \) by the natural way of composition. Unfortunately, composition is not a well-defined operation on \( R \) (for an example see [5]). So in general, the operation \( \circ \) is not well-defined which is caused by the fact that we involve relations between three generations.

31. However, there are at most two admissible values for a composition of two relationships. The first is always 0 and the second one depends on the composite relationships. Therefore, by defining the table of relationships operations (TRO) we label all of them by \(^a\). If there is one and only one admissible value, the composition will be unlabeled.

**Table 2**

*Table of relationships operations (TRO)*

<table>
<thead>
<tr>
<th>( \circ )</th>
<th>( Cou )</th>
<th>( P-C )</th>
<th>( C-P )</th>
<th>( Sib )</th>
<th>( Gp-Gc )</th>
<th>( Gc-Gp )</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>( Cou )</td>
<td>( \emptyset )(^c)</td>
<td>( P-C )</td>
<td>0</td>
<td>0</td>
<td>( Gp-Gc )</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>( P-C )</td>
<td>0</td>
<td>( Gp-Gc )</td>
<td>( Cou )(^b)</td>
<td>( P-C )</td>
<td>0</td>
<td>( C-P )(^a)</td>
<td>0</td>
</tr>
<tr>
<td>( C-P )</td>
<td>( C-P )</td>
<td>( Sib )</td>
<td>( Gc-Gp )</td>
<td>0</td>
<td>( P-C )(^a)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>( Sib )</td>
<td>0</td>
<td>0</td>
<td>( C-P )</td>
<td>( Sib )</td>
<td>0</td>
<td>( Gc-Gp )</td>
<td>0</td>
</tr>
<tr>
<td>( Gp-Gc )</td>
<td>0</td>
<td>0</td>
<td>( P-C )(^a)</td>
<td>( Gp-Gc )</td>
<td>0</td>
<td>( Cou )(^a)</td>
<td>0</td>
</tr>
<tr>
<td>( Gc-Gp )</td>
<td>( Gc-Gp )</td>
<td>( C-P )(^a)</td>
<td>0</td>
<td>0</td>
<td>( Sib )(^a)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^a\) There are two admissible values for the composition. The first is 0 and the second one is shown in the table.

\(^b\) The persons \( p_1, p_3 \) has to fulfill conditions on sex, age and marital status respectively like in Table 1.

\(^c\) The symbol \( \emptyset \) means that there is no admissible value.
32. The first column in TRO represents $p_1 \rightarrow p_2$ and the first row represents $p_2 \rightarrow p_3$. The $\text{Cou}$ relation labeled by $b$ in TRO requires special rules: We wish to calculate $p_1 \rightarrow p_3 = P \cdot C \circ C \cdot P$, which should be $\text{Cou}$. But in this case, relations alone are not able to guarantee the truth. More precisely, we have to check sex, age and marital status respectively like in Table 1. If these conditions are not fulfilled, then the whole household is called implausible (see Section 3).

3. Plausible households

33. Let $n > 2, H = (P, R)$ be a household and $r = p_1 \rightarrow p_2, s = p_2 \rightarrow p_3, t = p_1 \rightarrow p_3 \in R$, with pairwise distinct $p_1, p_2, p_3 \in P$. Assume that the following conditions on plausibility hold.

Plausibility conditions:
- $r \circ s \neq \emptyset$
- If $r \circ s \neq 0$, then $t \in \{0, r \circ s\}$
- If $r \circ s$ has label $b$, then Table 1 is satisfied

Then we can define a new operation $\cdot : R \times R \rightarrow R$ in the following way:

$$r \cdot s := \begin{cases} r \circ s, & \text{if } 0 \neq r \circ s \text{ has no label} \\ t, & \text{if } r \circ s \text{ has label } a \text{ or if } r \circ s = 0 \\ r \circ s, & \text{if } 0 \neq r \circ s \text{ has label } b \end{cases}$$

34. Statistics Austria uses the following approach:

(a) Take pairwise distinct $p_1, p_2, p_3 \in P$. Check the plausibility conditions. If they are satisfied and $t \neq 0$, then do nothing. If they are satisfied and $t = 0$ and $r \circ s \neq 0$, then replace $t$ by $r \circ s$. If they are not satisfied, stop and label $H$ to be implausible. Do that for all pairwise distinct $p_1, p_2, p_3 \in P$.

(b) Check whether a new relation $\neq 0$ in $R$ has been derived by step 1. If no - stop. If yes - repeat step 1.

35. This approach overwrites the relations $0 \in R$ as long as new relations are derived and checks in addition if $H$ is plausible.

Definition. A household $H$ is called plausible, if $n \leq 2$ or $H$ is not implausible by the approach. $H$ is called complete, if no new relation $\neq 0$ can be derived.

Assume that $H$ is plausible with size $|H| > 1$ and $p \in P$. The household status of $p$ is ...

... partner if and only if there exists $q \in P$, such that $p \rightarrow q = \text{Cou}$

... child (not of lone parent) if $p$ is not a partner and there exists a partner $q \in P$, such that $q \rightarrow p = \text{P-C}$

... child (of lone parent) if $p$ is not a partner and there exists $q \in P$ who is not a partner, such that $q \rightarrow p = \text{P-C}$

... lone parent if $p$ is not a partner and there exists a child $q \in P$, such that $p \rightarrow q = \text{P-C}$

... not alone living otherwise.

36. The household status implies the type of household (see [7]) and we get immediately the following sufficient criterion.

Criterion. In a strong-connected, plausible household, the type of household is uniquely determined.
37. If $H$ is implausible, one has to redefine at least one $r \in R$, $r \neq 0$ to $r = 0$. It is not easy and sometimes impossible to determine which relations should be redefined to 0 (e.g. two partnership relations in a three person household).

38. However, there are several ways to generate a plausible household from an implausible one. For the census 2011 we redefined all relations to 0 in such a household, but for the census 2021 we plan to apply the following stepwise method:

   • For an implausible household we redefine relations stepwise to 0 according to certain rules. After each step we check if the household becomes plausible and stop if possible.

39. The occurrence of an implausible household is not very likely, i.e. in the Austrian register-based census 2011, only about 0.05% of all private households with three or more persons are implausible.

4. Estimation of Relationships

40. From now on we assume that $H$ is a complete plausible, not strong-connected household. As we have seen, in such a household we are no longer able to guarantee the type of household.

41. Hence, we have to impute relations in $H$ such that the estimated household $\hat{H}$ stays plausible. Our imputation method is a combination of a hot-deck technique based on demographic characteristics together with an ordering relation based on normalized frequencies and some static rules involving date of registration and external household relations. Since we are interested in strong-connection we just estimate relations of types $Cou$, $P-C$. Hence, we need suitable distributions. An overview about the general data work flow of the Austrian census with special focus on the imputation process can be found in [2].

42. **Cou-distribution.** Let $s \in \text{(male, female)}$ and $a_d \in \mathbb{Z}$ arbitrary but fixed. Take a three-person households $H$ with persons $\{p_1, p_2, p_3\}$, where $p_i$ having age $a_i$ and sex $s_i$. Assume that $p_1 \rightarrow p_2 = Cou$, $p_2 \rightarrow p_3 = 0$ and the sub-household $\{p_2, p_3\}$ admits a $Cou$ relation by demographical rules and $a_d = a_2 - a_3$, $s_2 = s$. Since $p_2$ is already a partner, we define $p_2 \rightarrow p_3$ as a non-$Cou$ relation. Restrict the relations of types $\{P-C, Gp-Gc, Stb\}$ in the stock of households to those which could be a $Cou$ relation by demographical rules and who start with sex $s$ and have age-difference $a_d$. This set together with the non-$Cou$ relations forms the set of complementary events.

43. Comparing these events with the real $Cou$ relations in the stock of households (who start with sex $s$ and have age-difference $a_d$) leads to the probability distribution $d(Cou, s, a_d)$ of $Cou$.

44. **P-C-distribution.** Similarly as for non-$Cou$ relations, one can define non-$P-C$ relation $p_1 \rightarrow p_2$ if a sub-household $\{p_1, p_2\}$ admits a $P-C$ relation by demographical rules and $p_2$ has at least a parent $q \neq p_1$ with the same sex $s$ as $p_1$. Restrict the relations of types $\{Cou, Gp-Gc, Stb\}$ in the stock of households to those which could be a $P-C$ relation by demographical rules and who start with sex $s$ and have age-difference $a_d$. This set together with the non-$P-C$ relations forms the set of complementary events.

45. Comparing these events with the real $P-C$ relations in the stock of households leads to the probability distribution $d(P-C, s, a_d)$ of $P-C$. Note that the result obtained that way heavily depends on the non-relations. Before one can use the distribution, one has to ensure that there are enough such non-relations. Perhaps one has to shrink the set of (complementary) events, e.g. restriction to households with $n \leq 3$.  

7
46. Further, an imputed relation has to fulfill rules like those presented in Table 1 and additionally rules include the variables parents and ages at registration (e.g. a Cou-relation (opposite sex) requires ages at registration ≥ 16).

47. **Ordering relation.** If a household allows to impute a relation for which more than one type (≠ 0) is possible or the household allows to impute two or more relations - which relation should be tried to be estimated first? The answer can be crucial (in particular if n > 2), since an imputed relation affects the subsequent estimation procedure. Hence, we try to order the possible relations and types among themselves according to their probability, starting from the most probable. We do that by calculating the relative frequency distribution \( f(r, s, a) \) of the relation \( p_1 \rightarrow p_2 = r \in \{\text{Cou}, P-C\} \) with sex \( s_1 = s \in \{\text{male, female}\} \) and age-difference \( a_\Delta = a \) (see [5]).

48. The general case is based on the special case of a two person household: To estimate a relation \( p_1 \rightarrow p_2 = \hat{r} \) in a household \( H = ((p_1, p_2), \{0\}) \) a uniformly distributed random variable \( x \) between 0 and 1 is produced and assigned to \((p_1, p_2)\). If the type in question is \( r_1 \) and \( x \leq d(r_1, s, a_\Delta) \) then we accept \( r_1 \). If not, we look whether we can estimate another type \( r_2 \). \( f(r_2, s, a) \leq f(r_1, s, a) \) for the relation \( \hat{r} \).

49. Now we are able to expand this procedure to \( n \geq 3 \) by estimating relations stepwise.

50. **Decomposition of \( H \).** Let \( H = (P, R) \) be a fixed plausible household with \( n \geq 3 \) persons. Then \( H \) is a disjoint union of the strong-connected components \( C_1, ..., C_m \) of \( H \) (i.e. the maximal strong-connected sub-households of \( H \)), \( H = \bigcup_i C_i \). Each pair \((p_i, p_j)\), \( p_i \in C_i, p_j \in C_j \) \( 1 \leq i < j \leq m \) can be viewed as a two-person sub-household of \( H \) on which we can apply the procedure above if \( p_1 \rightarrow p_2 \notin \{\text{Gp-Gc, Gc-Gp, Sib}\} \) (an example is shown by Figure below). This application yields a (possibly empty) set \( U \) of all possible new relation for \( H \)

Possible relations in a certain household

![Possible relations diagram]

51. If \( U \neq \{\} \), we try impute new relationships stepwise as follows: Take a relationship \( r_{\text{new}} \) from \( U \), which is maximal by the ordering. Again, a uniformly distributed random variable \( x \) between 0 and 1 has to satisfy \( x \leq d(r_{\text{new}}, s_1, a) \). If the new household \( \hat{H} = (P, R \cup \{r_{\text{new}}\}) \) is plausible, we replace \( H \) with \( \hat{H} \), calculate \( U \) again and so on. If \( (P, R \cup \{r_{\text{new}}\}) \) is implausible, then remove \( r_{\text{new}} \) from \( U \). If \( U \neq \{\} \), take another maximal element \( r'_{\text{new}} \in U \) and so on.

The procedure terminates if \( U = \{\} \), i.e. if no new relation can be imputed.

Remark: It is possible that in huge households (e.g. \( n > 10 \)) this procedure generates many households of the type Two-or-more-family household. To prevent this event, one can introduce further restrictions (e.g. limit the number of families in \( H \) by certain rules).

### IV. Improvements and outlook

52. To improve a statistic one needs first of all a tool to assess the quality of the statistic. We are interested in statistics based on administrative sources. Such an assessment is a
broad field which reaches from the quality of the data sources to the outcome statistics (see [1] for a structural quality framework in this topic).

53. **Quality measure.** Let $H = (P, R)$ be a plausible household. The imputation process leads $H$ to a complete household $\bar{H} = (\bar{P}, \bar{R})$. Assume that $F = (P_F, R_F)$ is a family of $\bar{H}$ (i.e. a sub-household of $\bar{H}$ which forms a family). Then we can define a quality measure $\mu(F) \in [0,1]$ (see [5] for a precise definition of $\mu$) of $F$ by taking the ratio of the original relations by all relations $R_F$ of $F$. Actually $\mu$ measures how reliable a family is. Counting all families $F$ by $\mu(F)$ assesses the quality of the family statistics.

54. The following table shows the increase of $\mu(F)$ for all families. The reason for the increase is founded by archived data on relations as well as on slight improvements in the general process.

<table>
<thead>
<tr>
<th></th>
<th>Austrian census 2011</th>
<th>Austrian Register-based Labour Market Statistics 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Families $F$</td>
<td>2,306,650</td>
<td>2,322,321</td>
</tr>
<tr>
<td>$\mu(F) = 1$</td>
<td>79.5%</td>
<td>80.1%</td>
</tr>
<tr>
<td>$\mu(F) \in (0,1)$</td>
<td>6.1%</td>
<td>5.7%</td>
</tr>
<tr>
<td>$\mu(F) = 0$</td>
<td>14.4%</td>
<td>14.2%</td>
</tr>
</tbody>
</table>

55. From a practical point of view it is unrealistic to have this measure equal 1 for all families. But what are the reasons for missing relations and how can one reduce it? The main reasons for missing relations are:

(a) Data sources: Formal errors in the raw data (range errors, missing primary keys or item nonresponse) resp. missing new relations by unknown reasons. It is the aim to improve such problems by an additional data source, the central civil status register.

(b) Adult children: Statistics Austria has been collecting data on relationships since 2006, so there is a gap for adult children before 2006. Of course, this will be improved in the future since the relations will be archived (see table below).

<table>
<thead>
<tr>
<th>Age of youngest child in the family</th>
<th>Austrian census 2011</th>
<th>Austrian Register-based Labour Market Statistics 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total $\mu(F) = 1$</td>
<td>total $\mu(F) = 1$</td>
</tr>
<tr>
<td>Under 25 years</td>
<td>1,155,435</td>
<td>1,154,159</td>
</tr>
<tr>
<td></td>
<td>94.5%</td>
<td>94.5%</td>
</tr>
<tr>
<td>25 years and over</td>
<td>271,528</td>
<td>273,066</td>
</tr>
<tr>
<td></td>
<td>32.7%</td>
<td>37.0%</td>
</tr>
<tr>
<td>Families with child(ren)</td>
<td>1,426,963</td>
<td>1,427,225</td>
</tr>
<tr>
<td></td>
<td>82.7%</td>
<td>83.5%</td>
</tr>
</tbody>
</table>

(c) Consensual union couples without resident children: These are typical young adults who are not co-insured through the partner's national health insurance. Hence their relationship is not contained in any register. Under the present circumstances it is not possible to reduce such missing relations.

<table>
<thead>
<tr>
<th>Families in the Austrian census 2011</th>
<th></th>
<th>$\mu(F) = 0$</th>
</tr>
</thead>
<tbody>
<tr>
<td>total</td>
<td>2,306,650</td>
<td>14.4%</td>
</tr>
<tr>
<td>Consensual union couples without resident children</td>
<td>172,039</td>
<td>76.4%</td>
</tr>
</tbody>
</table>
International migration: The longer the residence of an immigrant, the higher the quality on relations. So, in some sense, there is a kind of time-lag which cannot be reduced.

<table>
<thead>
<tr>
<th>Year of arrival in the country (of at least one family member)</th>
<th>Families in the Austrian census 2011 total</th>
<th>$\mu(F) = 0$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>24,764</td>
<td>25.1%</td>
</tr>
<tr>
<td>2010</td>
<td>27,879</td>
<td>34.9%</td>
</tr>
<tr>
<td>2011</td>
<td>30,950</td>
<td>53.0%</td>
</tr>
</tbody>
</table>

56. In summary, one can say that improvements are possible for many families especially such with Age of youngest child in the family, 25 years and older.

V. References


