Chapter 3

The STRI Methodology: From Regulations to Impacts

The previous chapter outlined the importance of the services sector in Kenya and Rwanda, including as part of their overall stance on economic integration. This chapter turns to the question of how to quantify policies that restrict trade in services. An extended discussion of methodology is necessary, because the question is in fact a challenging one, given the large number of different regulations that affect services, and their complexity relative to the simple tariffs that are common in goods markets. Section 3.1 discusses in intuitive terms the STRI methodology, and specifically the version deployed by the OECD, which is adopted here. Section 3.2 then discusses the choice of sectors for this pilot project. Section 3.3 then presents the data collection methodology for those subsectors.

3.1 Measuring policy restrictiveness in services

Measuring trade restrictiveness for services is different from measuring it for goods. Goods encounter trade barriers from border taxes (customs duties), plus quantitative restrictions (quotas) and other non-tariff measures (NTMs). These measures are typically applied at the border, but some NTMs can be applied behind the border, in the form of regulatory measures and standards that affect trade. In services trade, frictions come primarily from regulatory measures, which are more akin to NTMs in goods. In goods, comparing restrictiveness of tariffs across countries is relatively simple at the product level: it is possible simply to compare tariff schedules, with a higher *ad valorem* tariff indicating a more restrictive policy stance. While issues of aggregation arise in the construction of economy-wide measures of restrictiveness even in goods (e.g. Kee et al., 2009), the situation is much less complicated than in services, owing to the preponderance of tariffs.

Conceptually, three stages are involved in estimating the restrictiveness of trade policy settings in services. First, it is necessary to collect data on a wide range of regulations that affect the ability of service providers to contest markets (entry barriers), and the cost of doing business for providers in the market (ongoing conduct barriers). Individual regulatory measures need to be coded according to a predetermined key so that the qualitative information contained in them can later be transformed into a quantitative scale, where a higher score indicates a more restrictive policy. To provide some intuition, Table 3.1 presents examples of common restrictions affecting particular modes of supply.

Once this data collection exercise has been completed sector by sector—because heterogeneity is more of a factor in services trade than is the case for goods—it is necessary to move to the second step of the methodology—namely, aggregating

Table 3.1 Examples of policy restrictions by mode of supply

Mode	Examples of restrictions
Mode 1: Cross-border supply	• Requirement for foreign service providers to establish a commercial presence, i.e. requiring them to switch to another mode of supply • Restrictions on business outsourcing • Regulations on consumer protection that unduly restrict trade
Mode 2: Consumption abroad	• Travel restrictions to the country where the service supplier is based and the service is offered • Regulations on domestic recognition of documents proving the act of receiving certain services (e.g. domestic recognition of foreign degrees in educational services)
Mode 3: Commercial presence	Restrictions on establishment: • Licences • Quotas on establishment • Restrictions on certain forms of legal entity • Minimum capital requirements • Limitations on the share of foreign capital • Prohibition of foreign direct investment in certain sectors • Location conditions Restrictions on operation: • Local content requirements • Operational permits and licenses
Mode 4: Movement of natural persons	• Visa requirements • Quotas on inflows of temporary workers • Limitation of the maximum period of stay

Source: Authors.

individual policy measures to produce what has come to be termed a Services Trade Restrictiveness Index (STRI). STRIs are sector-specific, and summarise the level of restrictiveness of the full set of regulations affecting that sector, both horizontal measures (i.e. those that affect all sectors) and sector-specific measures. A key issue that arises in this kind of aggregation is weighting: should all measures be given equal weights in the STRI, or are some types of policies more restrictive than others? Various approaches to answering this question are possible, ranging from purely statistical weighting schemes (e.g. Dihel and Shepherd, 2007) to the use of expert judgment.

Third, once the STRIs have been obtained, an econometric model can be used to relate them to economic outcomes of interest, such as prices, costs or trade flows, to produce estimates of the economic impacts of restrictions on services trade. This methodology is originally from the Australian Productivity Commission (see Dee, 2005, for a review).

Since first being deployed in selected sectors in the early 2000s, STRIs have been taken up by leading international organisations active in the trade domain. The World Bank's STRI project covers 103 countries and five sectors (Borchert et al., 2014).

It records policy restrictions in place in around 2008–2010, based on a survey of law firms for developing countries and publicly available sources for OECD countries. The range of policy restrictions captured is relatively narrow, with a focus only on those that embody legal discrimination against service suppliers from other countries. The World Bank is currently updating the database in conjunction with the WTO, but, as of the time of writing, these data are not available.

The OECD conducts the second major STRI project. This covers 44 countries and 22 sectors. The database and indices are updated annually, starting in 2014. As such, the project represents a more detailed reading of policies in sectoral terms than the World Bank database, and has the advantage of representing a clear moment in time, with regular updates. In addition, it also captures some non-discriminatory policies that affect services trade. This is an important point: as Dee (2005) argues, it is likely that non-discriminatory services policies will have bigger economic impacts than discriminatory measures, because they affect the real resource cost of doing business, not just the ability of incumbent firms to earn economic rents. Whereas the World Bank project relies primarily on law firms to supply information on policy restrictions, the OECD collects data directly, then validates these with government. Based on its greater level of sectoral specificity, its inclusion of some non-discriminatory policies, its data collection methodology and the fact that it is updated regularly, the OECD STRI currently represents the most efficient frontier in terms of quantifying barriers to trade in services. It is applied here to Kenya and Rwanda.

In terms of the three steps identified above, the OECD methodology, which is set out in full in Geloso-Grosso et al. (2015) can be summarised briefly. The first step is undertaken by the team directly, using Excel sheets to code information about possible policy restrictions and to note sources for transparency and dialogue purposes. Most measures are coded as 1 (restriction) or 0 (no restriction); where there is a numerical answer, the methodology applies thresholds for binary scores. One complexity of services regulations is that apparently liberal policies in one area can be rendered *de facto* null and void by a single highly restrictive measure in another area. For instance, if the foreign equity limit for services firms in a particular sector is zero—that is, foreign direct investment (FDI) is not permitted—then a lack of other specific measures dealing with foreign providers does not mean the sector is liberal: in fact, it is completely closed for Mode 3. For this reason, the OECD methodology takes account of dependencies among measures by coding dependent measures as 1 if there is a related measure that has the effect of closing the market. On the flipside, complementary measures are grouped and scored as 0 only if all measures in the bundle are not restrictive.

To aggregate these data into an STRI, the OECD methodology applies expert weights. Specifically, the organisation convened expert meetings for each sector, to bring together experts proposed by member countries, as well as others from the World Bank, the WTO and the Secretariat itself, including specialised departments. Together, these experts concentrated on identifying relevant policy measures for inclusion in the STRI, and deciding on how each measure should be weighted relative to the others.

Finally, to translate the numerical STRI—which ranges between 0 and 1—into an economic impact, Benz (2017) uses the concept of an *ad valorem* equivalent. In essence, his methodology makes it possible to map STRI scores to tariff equivalents. Data availability issues mean it is not possible to do this for every sector. Nonetheless, the results are striking: estimates of tariff equivalents range as high as 2000 per cent, and range between 20 per cent and 300 per cent in most sectors. Consistent with the results of Miroudot et al. (2013), this approach suggests trade costs are typically higher in services than in goods.

An additional way of translating numerical STRIs into concrete economic outcomes is by means of the concept of regulatory heterogeneity. Many services experts believe that differences in regulations between countries, not just their absolute level of restrictiveness, drive observed patterns of trade by influencing trade costs. The OECD Secretariat has developed an algorithm to compute measures of bilateral regulatory heterogeneity using the STRI data. Nordas (2017) shows that a reduction in regulatory heterogeneity of 0.05 points is associated with an increase in services exports of 2.5 per cent, and that the impact is larger with a lower overall level of restrictiveness. Again using the concept of an *ad valorem* equivalent, she goes on to quantify the effect of the average regulatory heterogeneity score in the OECD STRI sample as between 20 per cent and 70 per cent at low levels of restrictiveness.

The OECD's approach is followed here, in the interests of rigour, comparability and transparency. The STRIs constructed in this way measure *de jure* restrictions in place, not other *de facto* impediments that may exist to the operations of services firms. That is an important, but distinct, question—and different data are used to address it in Chapter 5. The second point to note is that the STRIs produced are based on MFN policies—that is, measures that apply to trading partners with whom there is no preferential agreement. Although regional integration is an important dynamic in East Africa, focusing on MFN restrictions not only provides an important baseline with which to compare preferential liberalisation but also identifies policies that cover the overwhelming bulk of imports in both Kenya and Rwanda. This work could be extended in future to look at the impacts of preferential agreements.

3.2 Selection of services sectors in this report

With the aim of looking at links between goods and services trade, an analysis is made of the trade restrictiveness of services sectors that are known to have an impact on the productivity and export performance of industry, particularly manufacturing, including through their involvement in global value chains. Hoekman and Shepherd (2015) use a combination of firm-level and country-level data to show that productivity in services sectors—which is negatively affected by overly restrictive policies—is associated with higher productivity and exports in manufacturing, because the latter uses services inputs extensively. This rationale leads naturally to a focus on backbone services sectors that provide important inputs to other parts of the economy. The potential gains from reforms in these sectors are very high, because they have strong spillovers to the rest of the economy.

To make the point clear, data from the OECD-WTO Trade in Value Added (TiVA) database can be used. The only African country in the database is South Africa, which is taken as a point of reference. Using sophisticated techniques to reconcile national accounts data, input-output data and trade data, TiVA makes it possible to analyse the origin of the value added content of exports. For instance, services value added accounted for 36.7 per cent of the gross value of manufacturing exports in 2011, the latest year for which data are available. Looking deeper into the services sectors that contributed to manufacturing exports in South Africa, it can be seen that transportation and storage accounted for 17.8 per cent of the services total, finance for 11.2 per cent and wholesale and retail trade (distribution) for 32.4 per cent. Together, these three sectors contributed 61.4 per cent of total services value added in South Africa's gross exports of manufactured goods.

Although the TiVA dataset does not cover Kenya and Rwanda, similar information is available from the Eora database. However, this information is presented with the major caveat that data quality are known to be inferior to in TiVA, and much of the information for small, lower-middle-income countries is imputed or estimated rather than observed. With this in mind, however, the Eora data show another way in which the three sectors are integrated with regional and global economies: out of the value of Kenya's and Rwanda's gross exports in these three sectors, foreign value added accounts for 21 per cent and 16 per cent, respectively. In other words, imports of goods and services are part of what facilitates the export success of these sectors.

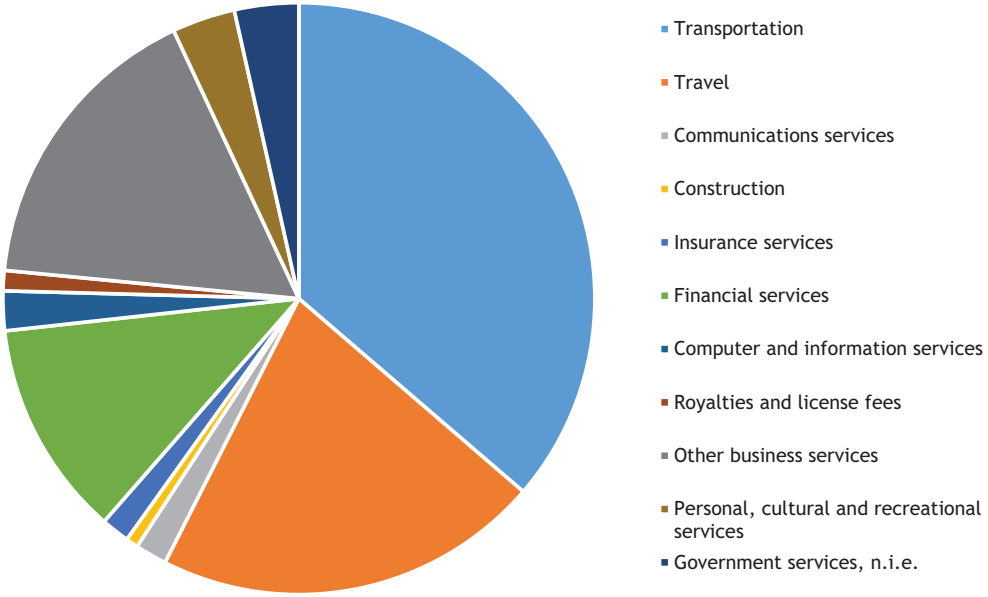
Given its pilot nature, this study can focus on only a limited number of sectors, not the full 22 the OECD considers in its work. There is a strong rationale for focusing data collection on sectors believed to have strong links to the rest of the economy, and where the gains from continued reforms could therefore be particularly high, as well as those sectors that have the strongest regional and global trade links. Based on the above analysis, transport, finance and distribution appear to be the leading priorities for Kenya and Rwanda from the point of view of both likely economic benefits and their potential to promote structural change by helping develop the manufacturing sector.

BaTiS data can be used to look more directly at the importance of these sectors to Rwanda's services trade. The sectoral disaggregation BaTiS uses identifies financial services, and transportation and storage as individual sectors. There is no individual entry for distribution but part of its activities, such as storage and warehousing, are caught under transportation and storage.

Figures 3.1 and 3.2 show that transportation and financial services accounted for significant shares of Rwanda's services trade in 2012. Specifically, they made up 48.1 per cent of imports and 22.3 per cent of exports. They made up the largest traded sectors aside from other business services, which groups together a wide range of activities. The importance of these sectors is quite consistent over time, with the import share in 2000 equal to 53.4 per cent and the export share equal to 24.2 per cent.

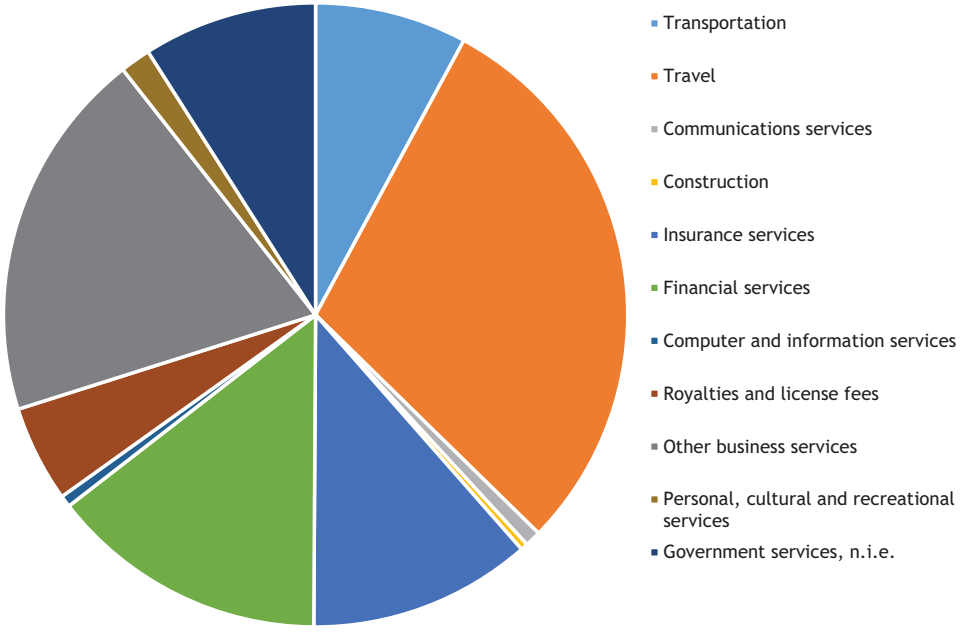
A similar analysis for Kenya shows that transportation and financial services together accounted for 37.0 per cent of imports and 38.7 per cent of exports in 2012 (Figures 3.3 and 3.4). As with Rwanda, in Kenya these sectors play a very significant role in trade.

Figure 3.1 Breakdown of Rwanda's services imports by sector, 2012



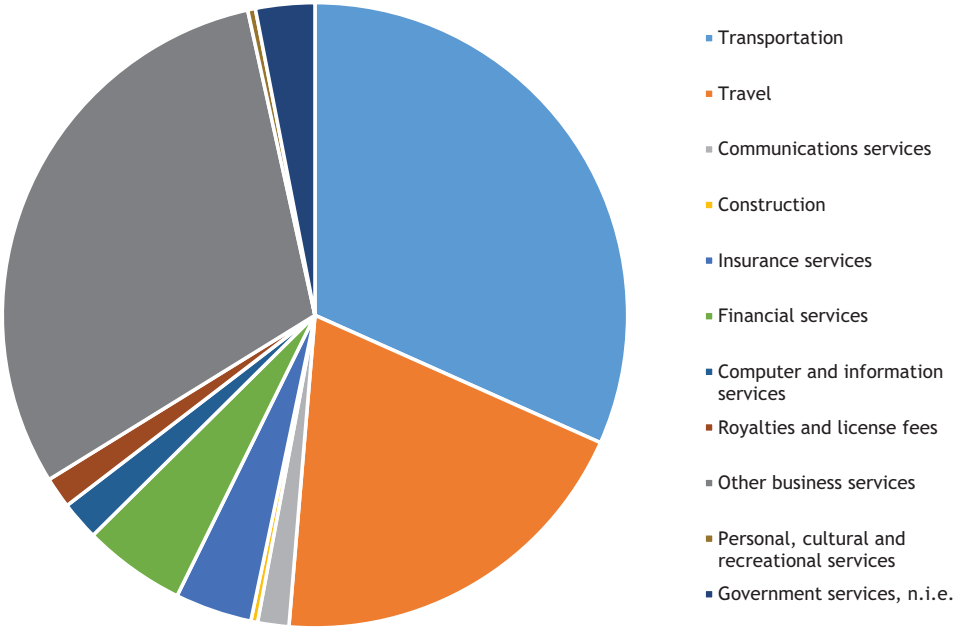
Source: WTO–OECD BaTiS dataset; authors' calculations.

Figure 3.2 Breakdown of Rwanda's services exports by sector, 2012



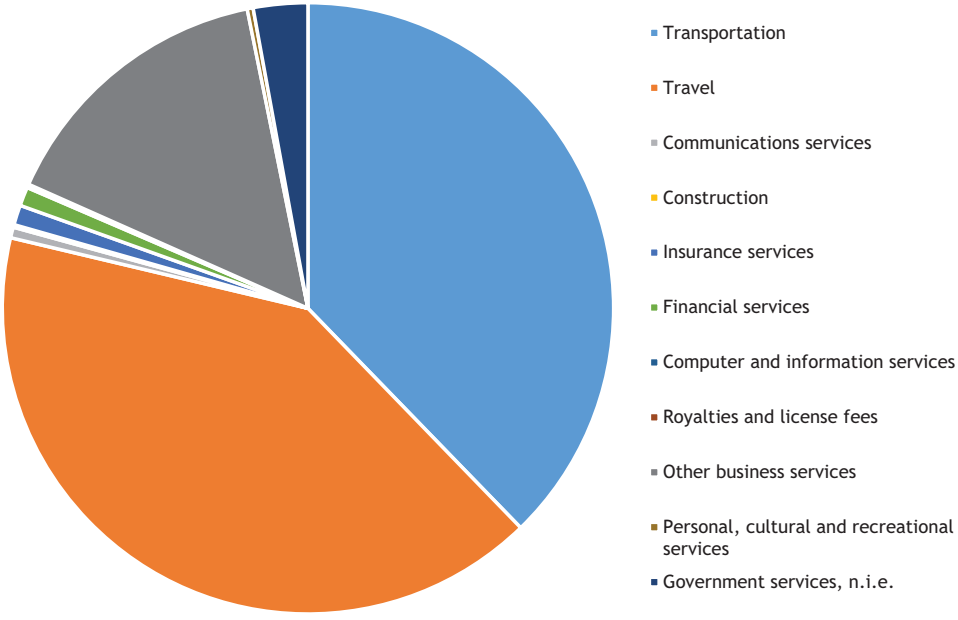
Source: WTO–OECD BaTiS dataset; authors' calculations.

Figure 3.3 Breakdown of Kenya's services imports by sector, 2012



Source: WTO–OECD BaTiS dataset; authors' calculations.

Figure 3.4 Breakdown of Kenya's services exports by sector, 2012



Source: WTO–OECD BaTiS dataset; authors' calculations.

Indeed, transportation is the largest import sector in Kenya, and it comes a close second to travel services in terms of exports. Again, these sectoral shares remain relatively stable even over the medium term. In 2000, transportation and financial services together accounted for 43.6 per cent of Kenya's imports and 37.9 per cent of exports.

This analysis confirms the view that it is appropriate to focus this pilot study on transportation, distribution and finance in Kenya and Rwanda. In addition, Government of Rwanda (2013) identifies financial services, transport and logistics as among its priorities, whereas Government of Kenya (2010) similarly highlights the importance of a productive financial sector, and of reducing costs in transport and distribution.

For STRI purposes, there is a need to map these large aggregates to individual sectors in the OECD scheme. For financial services, the OECD STRI scheme identifies commercial banking, which accounts for the lion's share of activity in this aggregate in developing countries, keeping in mind that insurance is treated as a distinct sector. Distribution is identified as such in the OECD STRI sectoral scheme. For transportation, the best fit appears to be road freight transportation. The other components of transportation in the OECD classification are rail, air and maritime. The last one is clearly not appropriate, as Rwanda is a landlocked country. Air freight is limited to high value to weight commodities, and, although it is developing in Africa, it is not yet as important as other modes. Road transport is responsible for the overwhelming bulk of trade within Africa, in particular between Kenya and Rwanda on the one hand and their regional Commonwealth partners on the other. Road transport, commercial banking and distribution are all included within the priority sectors of the EAC CMP (EAC and World Bank, 2016).

3.3 Data collection methodology

This study is much more limited in scope than the OECD's own data collection effort, which covers 44 countries and 22 sectors. The data collection effort was limited by time and scope to three sectors—commercial banking, road freight transport and distribution—in the two countries being studied: Kenya and Rwanda. Following a project kickoff meeting on 22 January 2018, data were collected and coded through 9 March 2018. Results are based on data available as of April 2018, when validation took place. The coding team worked in tandem with local experts on the ground in Kenya and Rwanda to identify relevant laws, analyse their provisions and resolve points of uncertainty or apparent inconsistency. In all, the team coded responses to 269 possible policy restrictions in each country, for a total of 538 measures in all. The work took account of around 30 relevant pieces of legislation and regulation in Rwanda, and nearly half as many again in Kenya. Access to these legal documents in digital form was facilitated by local experts, who were able to point the coders to the appropriate documents, and also to confirm the empirically important case in which there was no relevant law or regulation dealing with a particular question.

The coding team worked with Excel sheets provided by the OECD Secretariat. These sheets are the same ones the OECD uses in its work, thereby ensuring that

the results were fully comparable with theirs. The sheets catalogued the full range of policy restrictions to be assessed for each sector, and enabled the team to record responses that could feed into the quantitative analysis, as well as sources (legal texts) and hyperlinks whenever possible. While Kenya and Rwanda both have a substantial amount of legislation available online, local experts were also able to provide texts that were not generally available, so hyperlinks are not provided in all cases. The exercise is therefore as transparent and replicable as possible.

To give an idea of how the coding process was undertaken, consider the first measure in the commercial banking sector. That measures asks whether or not there is a maximum foreign equity limit imposed. The result is recorded as a percentage—namely, the maximum allowable percentage of a commercial bank that a foreigner can hold. In Kenya, the Banking Act 1989 was consulted. This Act does not impose any limitation on the percentage of a commercial bank that a foreigner can hold, subject only to the general prudential requirement that no individual should hold an interest of greater than 25 per cent. Consistently with OECD practice, which does not treat this kind of prudential limitation as a trade restrictive measure, the result was coded as 100. Indeed, the Act specifically allows foreign commercial banks to have full ownership of commercial banks in Kenya, so there is indeed no effective limit on foreign participation. For this measure, Kenya is therefore scored as having the least restrictive environment possible.

For transparency, Appendices 2 and 3 reproduce the list of laws consulted in each country. Full results of this coding process, which proceeded in a similar way to the above example for the other 537 measures captured in each country, are available on request. For each sector, relevant policy restrictions, the coding applied and the legislation on which the coding is based have been recorded. As is apparent from a review of these two appendices, it is not possible to briefly summarise the process of coding individual pieces of legislation. That is why this section has focused on outlining the general approach and the safeguards put in place to ensure accuracy and consistency.

To ensure maximum consistency, during the coding process particular attention was paid to the most comparable countries in the OECD's dataset—namely, South Africa, India and Indonesia. It was hypothesised that there might be some commonalities in terms of the restrictions low- and middle-income countries apply, and so it was ensured that similar policies in Kenya and Rwanda were coded in line with what is observed elsewhere in the OECD sample.

After coding was completed, the Excel sheets were supplied to the OECD Secretariat. The Secretariat agreed to run its own aggregation and weighting algorithms on the data. Again, this ensured complete consistency and comparability with existing work. Finally, government officials in Kenya and Rwanda were asked to validate the coding and results. No errors were found in the Kenyan coding; consultations in Rwanda necessitated some small changes in the data. Results presented in the following chapter take full account of this validation exercise, and are based on the small number of corrections introduced during that process.

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