Profiling tools for early identification of jobseekers who need extra support

December 2018 www.oecd.org/employment/connecting-people-with-good-jobs.htm

Profiling tools, which assess the job-finding prospects of jobseekers, **help to deliver employment services more efficiently**. First, more costly, intensive services can be targeted at jobseekers most at risk of becoming long-term unemployed. Second, services can be tailored more closely to the individual needs of jobseekers.

Engaging all actors involved is crucial for gaining acceptance of statistical profiling tools. Frontline staff of employment services should be involved in their development, testing and roll-out. Jobseekers should be informed of how the results are used to tailor services to their needs. Continuous evaluation and updates of the tools will improve their accuracy and help build trust.

Profiling tools are now more widespread due to progress in data management and analysis. Other factors include greater pressure for cost-effective public spending; the rapid surge in jobseekers during the global financial crisis; and a broadening of employment services to cover the "inactive".

Profiling tools are not without limitations. They may lack accuracy such that some jobseekers will be wrongly classified as "high" or "low" risk individuals. However, tools based on comprehensive data will be more accurate. The algorithm or statistical method underlying the profiling tool may also not be very transparent.

PROFILING IS A KEY TOOL IN THE PROVISION OF EMPLOYMENT SERVICES

Delivering services efficiently involves placing clients in different groups as a function of their needs. Think of emergency rooms in hospitals where patients are 'profiled' – called 'triage' in this field – to determine who needs immediate attention and who can wait. The need for profiling is not limited to emergency rooms. It applies to all organisations that experience large inflows of clients with widely different needs and expectations, who cannot all be treated immediately, and who need different treatments. The Public Employment Service (PES) in each country is a case in point. The PES continually processes new jobseekers, some of whom will easily transition to a new job without the need for intensive support, whereas others would benefit from more intensive counselling and guidance over a longer period.

Profiling tools assess the prospects of jobseekers to find work to differentiate jobseekers likely to become long-term unemployed from jobseekers likely to find work quickly. Typically, profiling tools are not used to assess the job-finding prospects of individuals with no or weak labour market attachment who are not registered with the PES. For a more "birds-eye" view, the OECD has developed a new tool as part of the *Faces of joblessness* project (Fernandez, R. et al., 2016), which covers the entire working-age population.

Countries use a variety of profiling tools. The focus of this policy brief is statistical profiling tools, which use a statistical model to predict labour market disadvantage. In contrast, rule-based profiling uses eligibility criteria (e.g. age, unemployment duration) to classify jobseekers into client groups, and caseworker-based profiling relies on caseworkers' judgement. All types of profiling are discussed in more detail in Desiere, Langenbucher and Struyven (2019). In practice, different types of profiling are often combined and countries like Austria, Denmark, New Zealand and Sweden use statistical profiling tools to support caseworker's judgement.

Profiling tools help improve the cost-efficiency of the PES by reducing deadweight costs, i.e. the costs related to providing services to jobseekers who would have found a job in any case, and by targeting resources to jobseekers most in need of help. Ireland and the Netherlands also use the results of their respective profiling tools to guide planning and allocate budgets within the PES. Australia and Sweden use their tools to determine payments to external service providers.

Profiling is an input into targeting and tailoring to jobseekers' needs. Countries, which apply profiling, use the results to target services to certain customers groups. Furthermore, the detailed results of profiling often support caseworkers in tailoring services to the jobseekers they serve.

The use of statistical profiling tools is now more widespread. While Australia and the US have introduced fully operational profiling systems based on statistical prediction already during the 1990s, the approach has gained prominence in Europe over the past decade and more countries have introduced profiling systems. Statistical profiling models are more widely used now because real-time data availability has increased and complex statistical models and the required computing power are now widely available. Furthermore, countries often had to rethink their approach to identifying jobseekers at risk due to: i) budgetary pressures or increased inflows of jobseekers following the global financial crisis; ii) changes in the composition of jobseekers and a greater diversity of client groups; iii) a stronger focus on activation (i.e. motivating and encouraging jobseekers to find work in exchange for

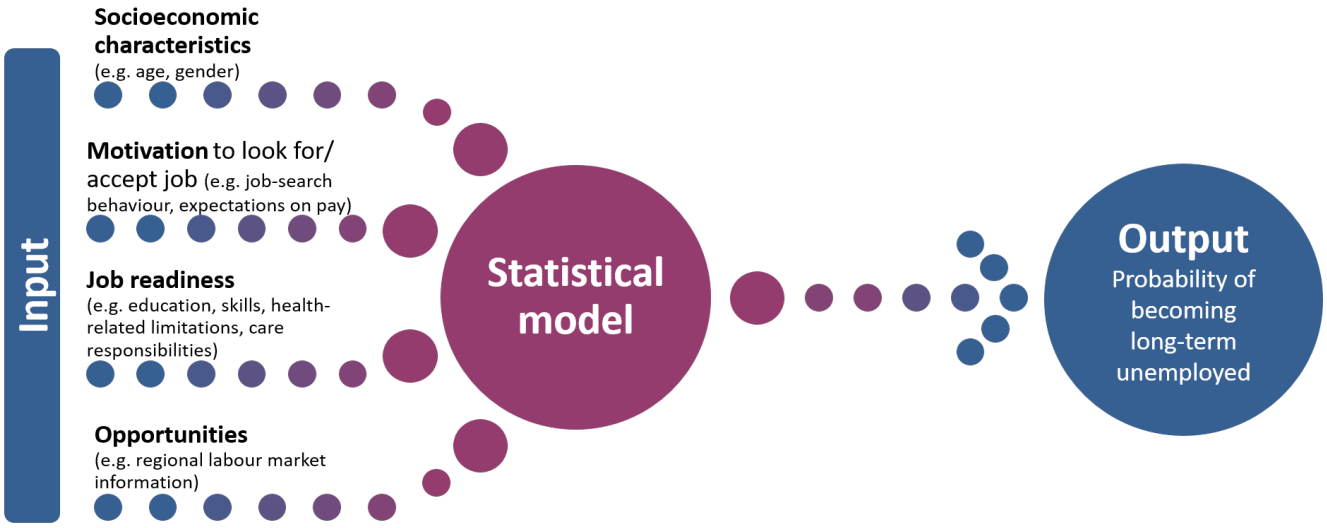
benefits); and iv) a greater diversity of employment forms and shorter job tenures (at least for some groups).

HOW TO DESIGN A STATISTICAL PROFILING MODEL AND WHAT TO WATCH OUT FOR

What determines the accuracy of profiling models is the quality and type of the data input. Four types of input variables can be distinguished (see Figure). These include socio-economic characteristics of the jobseeker, and the three key job finding dimensions of motivation, job readiness and job opportunities. Hence, both "hard" factors such as age and educational level and "soft" factors such as motivation and job aspirations can be included in statistical profiling models. Several PES are exploring new types of data. For example, in Belgium, the Flemish PES registers the job search activity of jobseekers on its website and includes this "click data" in the profiling model.

The usefulness and legitimacy of statistical profiling models hinge on model accuracy. Statistical profiling models rank jobseekers according to their risk of becoming long-term unemployed. Using this ranking, jobseekers can be classified in two (or more) groups, the "low-risk" and "high-risk" jobseekers. Statistical models are never perfectly accurate. Some jobseekers will be wrongly classified in the high-risk group and nevertheless quickly resume work, whereas others will be classified as low-risk but may become long-term unemployed. Both errors reduce the cost-efficiency of service delivery and, perhaps more importantly, jeopardise confidence and trust in the use of profiling. Few empirical studies have tried to compare the accuracy of profiling models with caseworkers' judgement and those that did suffer from drawbacks in the study design. Profiling models are not costless to design or maintain and decisions based on wrong predictions could result in increased costs rather than improving cost efficiency. Countries using such tools, consequently, should not only consider the accuracy of these tools, but also assess costs and benefits of decisions based on them.

Figure : The building blocks of stastistical profiling models



Regular updates of profiling models are important to ensure accuracy. As statistical profiling models are developed using historical data, the models need to be updated regularly to remain accurate. With the structure of the economy changing, certain characteristics of jobseekers (e.g. experience in a now declining sector) that in the past strongly contributed to resuming work quickly are not necessarily still good predictors today. The same is true for regional labour market information, which also needs to be updated regularly. When the profiling model is based on administrative data, it is straightforward to recalibrate the model using the most recent datasets.

HOW IS PROFILING USED?

Several OECD countries have developed and implemented statistical profiling models since the 1990s. The most well-known and well-documented examples are the *Work Profiler* in the Netherlands, the *Job Seeker Classification Instrument* in Australia and the *Worker Profiling and Reemployment Services* (WPRS) initiative in the US. Presented here are two new and innovative examples of statistical profiling tools from Flanders (Belgium) and Austria (see Box).

Profiling is frequently used to determine the timing and intensity of the support for jobseekers identified as at risk of becoming long-term unemployed. In the Netherlands, for instance, only jobseekers who are assessed as having a high risk of long-term unemployment are invited for a face-to-face interview with a caseworker early on. Jobseekers with a low risk are initially referred to digital services only. Nevertheless, also low-risk jobseekers will be invited for a face-to-face interview, at the latest after six months of unemployment. In contrast, both the US and Austria have shifted to providing more support to jobseekers in the 'middle' of the distribution.

Statistical profiling can complement caseworkers or support them. In some countries, statistical profiling automatically determines the frequency and timing of contacts and/or assignment to different service streams. In other countries, statistical profiling can be overruled by caseworkers and is only used to support them. The first approach is followed in Australia, Ireland and the US and aims to allocate resources most efficiently and effectively. A fully voluntary approach has been adopted by Sweden and Denmark. If caseworkers' use of statistical profiling is voluntary, it is important to understand why caseworkers might sometimes not use these tools and address those reasons accordingly.

Profiling supports coordination with external service providers. The outcomes of profiling tools can support decisions on which jobseekers should be referred to contracted-out labour market services or programmes. The results of the profiling then also determine payments to external providers. A far-reaching example is Australia, which has fully contracted out its employment services to external providers since 1998. Since then, a statistical profiling tool – the *Job Seeker Classification Instrument* (JSCI) – assesses jobseekers' level of labour market disadvantage. The results of the JSCI determine the different service streams that jobseekers are assigned to and outcome payments providers receive.

Statistical profiling in Belgium (Flanders) and Austria

New techniques and data in Flanders (Belgium). Applications of artificial intelligence for use in profiling have not been widely applied. One notable exception is the application of machine learning algorithms at the Flemish PES (VDAB). The profiling model estimates a jobseeker's probability of being unemployed for more than 6 months using a *random forest model*, which uses hundreds of different variables. The model is built in a flexible way so that it can be updated regularly in order to remain accurate. The underlying data include detailed information on jobseekers' socio-economic characteristics as well as some information on jobseekers' labour market history. Information collected by caseworkers during previous and current unemployment spells is also included. An additional innovation is the use of "click data", which monitors jobseekers' activity on the PES website, including clicking on job vacancies. This is considered a proxy for job search behaviour and motivation. The statistical profiling model is part of a new contact strategy, which aims to reach and screen all new jobseekers within six weeks after registration at the PES. The model, which is compulsory for caseworkers, is meant to assist them in decision-making, not to impose it. Three further innovations are currently being examined: i) adding more behavioural information through a short online questionnaire; ii) developing a tool that visualises barriers to employment; and iii) developing a tool that suggests specific (online) programmes to a jobseeker and caseworkers based on the jobseeker's profile and the experiences of other jobseekers with a similar profile.

A new profiling tool in Austria. The Austrian PES introduced its first statistical profiling model (*AMAS*) in November 2018 and will evaluate its performance and caseworker acceptance in 2019. The model achieves a very high level of accuracy, using existing administrative data sources only (i.e. there is no additional data collected). The profiling model consists of two functions, which assess clients' likelihood of reintegration into the labour market in the short term and long term. The short-term function assesses the probability of moving into unsubsidised employment for at least three months in the first seven months after the start of unemployment. The long-term function estimates the probability of moving into unsubsidised employment for at least six months over 24 months. Clients are then assigned to three different client groups: high, medium and low chance of labour market reintegration. The model makes use of socio-economic variables (gender, age, nationality), information on job readiness (education, health limitations, care responsibilities), and opportunities (regional labour market situation). A clear strength is the use of all available labour market history information for each jobseeker, including detailed information on prior work experience (type and intensity), frequency and duration of unemployment, and participation in active labour market programmes. The full labour market history is available for about two thirds of all new clients. The history is typically incomplete for youth, individuals with longer periods outside the labour market and migrants.

OVERCOMING THE LIMITATIONS OF STATISTICAL PROFILING

Statistical profiling systems have a number of inherent limitations, including data lags, a lack of accuracy, and a lack of transparency. First, automated decisions are as good as the data used to inform them. These data are representative of the past but not necessarily of the present or the future. Second, even in systems based on many factors, some jobseekers will be wrongly classified as high or low risk individuals. This will inevitably entail statistical discrimination by treating all individuals with the same observed characteristics as being identical in their risk of unemployment. Third, difficulties in scrutinising or understanding the algorithm or statistical

method used. All of these limitations are endemic to statistical profiling systems, and it is therefore important to continuously improve the design of these systems. Improving model accuracy requires richer data (e.g. labour market history and soft skills) and regular updates. Some countries choose to mitigate the drawbacks of statistical profiling by using the tools as only one of the components in the decision-making process, rather than automating decisions based on – sometimes wrong – outcomes of a statistical model. However, caseworkers may also incorrectly assess a jobseeker's risk of long-term unemployment. As has been argued before, evaluations should therefore be carried out on whether this is cost-effective in terms of the benefits achieved, i.e. aligning better the support jobseekers receive relative to their needs, and the extra costs incurred with respect to additional caseworker resources required.

Involving all stakeholders in the implementation of any type of profiling early on is crucial. In the past, several countries have developed a profiling system without it being implemented. In other countries it was scaled back after being implemented because caseworkers did not consider the tool useful and did not trust the results from the tool. Supporting and fostering a data-driven and innovation oriented culture, rolling out pilot projects in order to learn by trial and error, and involving caseworkers, frontline staff and jobseekers when testing the new system and procedures, help to build support for new tools and facilitates the transition to a new system. Once implemented, continuous evaluation and refinements of the system based on feedback from all stakeholders will improve the system and help to build trust in the system.

Developing a positive narrative for profiling. Critics dispute that it is in the jobseeker's favour to be identified as someone with a high risk of becoming long-term unemployed, because then the jobseeker is more easily exposed to follow-up and job search control compared to a jobseeker who is identified as a low-risk individual. In order to ensure the legitimacy and fairness of profiling models, it is important to frame profiling and the services provided as a result in a positive narrative and use it to support rather than punish jobseekers.

Stronger involvement of jobseekers in the profiling process. Finally, even though it is not common practice now, there may be a case for involving jobseekers to a greater extent in profiling. Denmark is an exception, and already does this: All results of the profiling are shared with both caseworkers and jobseekers to achieve full transparency. In contrast, some might argue that not sharing the profiling outcome avoids discouraging the jobseekers. Different considerations might apply when profiling is used to determine payments to private providers as in Australia and Sweden. Sharing detailed results then carries the risk of manipulation by providers to achieve higher payments. Whatever the choice, without the active involvement of jobseekers in the actions taken based on the profiling model, no system will deliver effective employment services.

Further information

This policy brief is based on Desiere, S., K. Langenbucher and L. Struyven (2019), "Statistical Profiling in Public Employment Services: An international comparison", *OECD Social, Employment and Migration Working Papers*, No. 224, OECD Publishing, Paris, https://doi.org/10.1787/b5e5f16e-en.

Also published alongside the policy brief are presentations from the OECD Technical Workshop "Profiling tools and their use in active labour market policies", held on 21 June 2018 in Paris.

References

Desiere, S., B. Van Landeghem, and L. Struyven (2019), "Wat het beleid aanbiedt aan wie: een onderzoek bij Vlaamse werkzoekenden naar vraag en aanbod van activering", HIVA KU Leuven.

Fernandez, R. et al. (2016), "Faces of Joblessness: Characterising Employment Barriers to Inform Policy", *OECD Social, Employment and Migration Working Papers*, No. 192, OECD Publishing, Paris.

Holl, J., G. Kernbeiß and M. Wagner-Pinter (2018), "Das AMS-Arbeitsmarktchancen-Modell", Arbeitsmarktservice Österreich, Wien.

Citation

Please cite as: OECD (2018), "Profiling tools for early identification of jobseekers who need extra support", *Policy Brief on Activation Policies*, OECD Publishing, Paris.

Contact

Kristine Langenbucher (kristine.langenbucher@oecd.org; +33 1 45 24 18 37)

Theodora Xenogiani (theodora.xenogiani@oecd.org; +33 1 45 24 17 85)

Photo credits: © Sergio77/Shutterstock.com