

Self-Employment and Wage Discrimination in Switzerland

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1. INTRODUCTION

Like many others developed economies, Switzerland has experienced a rise of its self-employment rate since the 1980's reversing what had been an almost secular downward trend. According to census data, the reversal of the trend was first observed between 1980 and 1990 when the rate of self-employment increased from 9.7% to 10.6%. Since then, the rate of self-employment has kept increasing. According to the Swiss Labor Force Survey (SLFS), the rate of self-employed workers (including incorporated self-employed and family workers) moved from 15.2% to 18.4% between 1991 and 1997. The rise of self-employment has been sharper among men than women and among foreigners than natives.

Self-employment has given birth to a growing literature in recent years. Several studies have focused on the analysis of the determinants of self-employment in order to explain the increasing trend of the self-employment rate. Other studies have focused on the interactions between the paid-job market and self-employment. This paper follows the second approach by attempting to test whether groups suffering from wage discrimination on the Swiss labor market are pushed into self-employment. The basic idea is that individuals who are discriminated against on the wage-job market will try to avoid the income penalty they face by going into the self-employment sector in order to earn an income that may reflect their true productivity.

In this paper, we focus on the determinants of self-employment of groups that are discriminated against on the paid-job market and compare them with their fairly treated counterparts. We first analyze the factors influencing the self-employment decision of foreigners. Although the rate of self-employment among foreign workers is much lower than among natives, the rate of increase of self-employment among the former is notably higher. In 1991, 6.85% of the non-agricultural foreign labor force was self-employed (excluding family workers), while this figure climbed to 8.75% in 1997. This represents a rate of increase of about 27.7%. In the mean time, the share of native self-employed workers has risen from 12.51% to 14.14%. The higher propensity to become self-employed shown lately by foreigners is not the only interesting feature of this group.

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Indeed, there is some evidence that foreigners don't have equal opportunities on the Swiss paid job market, especially first generation immigrants.¹ The Swiss immigration policy has followed the almost explicit goal of providing cheap labor to employers. This is emphasized institutionally by the fact that immigrants are not allowed to run their own business until they get a permanent resident status which may take up to ten years depending on the immigrant's country of origin.

In this study, we also analyze the self-employment decision of women. Unlike foreigners, women do not show an higher than average propensity to become self-employed. However, female workers suffer from wage discrimination as well as foreign workers.² Moreover, the sectorial decision of women (i. e. between self-employment or wage work) may also be driven by family related factors. For example, self-employment, because of its flexibility, could prove to be very attractive for women who try to cumulate family life and a professional career.

The paper is organized as follows: section 2 describes the underlying theoretical framework, section 3 provides a brief review of prior empirical evidences. The econometric methodology is described in section 4 and section 5 presents the data set used. The main results are discussed in section 6 and section 7 concludes and summarizes.

2. THEORETICAL BACKGROUND

The theory of self-employment relies mostly on the comparison of income between two sectors, wage-work and self-employment, individuals choosing the sector which provides the highest rewards.³ In the case of wage discriminations, one can expect that the groups which are discriminated against will avoid to enter paid jobs as their earning will be lower than their true productivity. Indeed, wage discriminations will increase the probability that the expected income from paid jobs will be lower than the expected income from self-employment for the discriminated against group.

Following DE WIT (1993b), a simple self-employment model incorporating wage discrimination can be proposed. Consider an industry in which a homogeneous good is produced. The demand for this product, $X(p)$ is strictly decreasing in its price p . Individuals have the choice either to become self-employed or to choose an outside option which is paid employment. If the latter is chosen, they earn a given wage w . Otherwise, they run a firm and are price takers on the good market. Individuals will differ only in their entrepreneurial ability θ .

Entrepreneurial ability $\theta \in [\underline{\theta}, \bar{\theta}]$ across individual is denoted by $H(\theta)$. As individuals produce a homogenous product, entrepreneurial ability will only affect the cost function

1. For example, DE COULON (1998) brings convincing evidence of discrimination against foreigners on the paid job market in Switzerland.
2. see BOYMOND (1993).
3. see DE WIT (1993b) for a thorough survey of self-employment models.

of the self-employed.⁴ We further assume that the cost function $c(\theta, x)$ as well as the marginal cost are strictly decreasing in θ . So the self-employed individual maximizes its profit by choosing the appropriate level of output x :

$$\max_x [\pi \equiv px - c(\theta, x)] \quad (1)$$

which means that the level of production and the profits will directly depend on θ . Of course, the higher is θ , the higher are the profits and the production level $x(\theta, p)$ as individuals with a greater θ have a lower marginal cost.

It should be noted that entrepreneurial ability has no impact on the outside option w which is identical for all individuals.⁵ Individuals will enter self-employment as long as $\pi(\theta, x)$ is greater than the outside option w and an equilibrium will be reached when:

$$\pi = px - c(\theta^*, x) = w \quad (2)$$

θ^* being the entrepreneurial ability of the marginal individual who is indifferent between self-employment and paid-employment. θ^* can be seen as a threshold of entrepreneurial ability for a given level of w as anyone with $\theta < \theta^*$ will choose paid employment while individuals with $\theta > \theta^*$ will become self-employed. For each level of θ^* , there is a certain number of self-employed individuals. This follows from the identity:

$$n = N \int_{\theta^*}^{\bar{\theta}} dH(\theta) \quad (3)$$

which lead to the equilibrium on the good market:

$$n = N \int_{\theta^*}^{\bar{\theta}} x(\theta, p)(\theta) = X^d(p) \quad (4)$$

An increase in the number of self-employed workers due to a fall in the wages will induce a fall in p in order for the market to clear. As a consequence, profits will decrease for all self-employed which induce a negative relationship between the number of self-employed and the profits of self-employed individuals. In the mean time, the ability of the marginal self-employed is also negatively related to the number of people becoming self-employed.

In the presence of labor market discrimination, different groups will face different wages. Consider now a workforce split into two groups, one being discriminated against

4. CLARK and DRINKWATER (1998) propose a model in which the quality of the good differs across individuals with different entrepreneurial abilities. The main conclusions of the model are not altered by this refinement.

5. This is clearly a simplifying assumption that will be relaxed in the empirical section of the present paper.

on the paid job market and the other being fairly treated. The discriminated against population will face the wage w_d whereas the non-discriminated against population will face the wage w_n with $w_n > w_d$. We assume that the distribution of entrepreneurial ability is equivalent among discriminated against and non-discriminated against groups, so discriminated against workers will be indifferent between self-employment and paid employment if:

$$\pi(\theta_d^*, p) = w_d \quad (5)$$

For the non-discriminated group, the condition becomes:

$$\pi(\theta_n^*, p) = w_n \quad (6)$$

As $w_n > w_d$, the profit of the marginal discriminated against self-employed will be lower than the profit of the marginal non-discriminated against self-employed. Since the profits are negatively related to θ^* , the marginal ability of the discriminated against self-employed will be lower than the one of the non-discriminated self-employed. From (3), it follows that the proportion of discriminated against individuals choosing self-employment will be higher than the proportion of fairly treated individuals choosing the same kind of employment.

However, works by BORJAS and BRONARS (1989) and by COATE and TENNYSON (1992) have shown that the basic theoretical model of entrepreneurship proposed in this section can be challenged on various grounds. BORJAS and BRONARS argue that minorities, instead of being pushed into self-employment by wage discrimination, are pulled away from entrepreneurship because of consumer discrimination. On the other hand, COATE and TENNYSON propose a theoretical model in which wage discrimination produces statistical discrimination on the credit market. They further assume that the credit market is the key market to enter entrepreneurship and that lenders have only imperfect information about the borrowers (they know only whether an individual belongs to a discriminated against or to a fairly treated group). As discriminated against individuals face a lower opportunity cost to become self-employed, they will be on average of lower entrepreneurial ability. This induces lenders, who have no information on individual entrepreneurial skills, to charge an higher interest rate or ask for higher collateral to discriminated against individual. Of course this argument holds only if liquidity is binding which we cannot formally test in the present paper.

3. EMPIRICAL EVIDENCE

Several empirical papers have investigated the issue of ethnic self-employment. CLARK and DRINKWATER (1998) have found evidence that discrimination contributes to ethnic self-employment in Britain. However, they conclude that wage discrimination does not

tell the whole story and argue that cultural factors may also play a crucial role. FAIRLIE and MEYER (1996), studying ethnic and racial self-employment differences in the US, show that the groups with the highest rates of self-employment are not the more disadvantaged in the labor market. Moreover, they find that ethnic groups coming from a country with a high self-employment rate do not have a high self-employment rate in the US. The latter conclusion is challenged by YUENGERT (1995) who find that the home country self-employment rate accounts for approximately 55 % of the immigrant-native self-employment differential.

BORJAS and BRONARS explain the lower rate of self-employed among minorities in the USA with a model of consumer discrimination. Consumer discrimination lowers the relative advantage to become self-employed off-setting the effects of wage discrimination. Their empirical test confirm the theoretical model as they find that blacks and other minorities are negatively selected towards self-employment which is not the case for the whites.

Different rates of self-employment between natives or immigrant or between ethnic groups can be explained by liquidity constraint. If capital is binding, it seems obvious that the more disadvantaged groups will have a harder time to gather the capital needed in order to launch a self-employed activity. Moreover, minorities or immigrants may face discrimination on the credit market itself. BLANCHFLOWER et al. (1998), using banking data, show that minorities do not have an equal access to credit in the USA.

The literature on women self-employment is rather scarce. DEVINE (1994), is one of the few authors who has investigated this issue. Her results suggest that one of the main causes of female self-employment in the USA is the presence of a self-employed spouse; a working wife is nearly four times as likely to be self-employed if her husband is also self-employed. Same sort of evidences are found by BRUCE (1999) whose results suggest that having a self-employed husband almost doubles the probability of a woman to become self-employed.

As for Switzerland, no formal attempt has been made to measure the determinants of foreign or female self-employment. However, we can mention PIGUET (1993) who investigates the sociological factors of foreign self-employment in Switzerland. He argues that self-employment has a ethnic component in Switzerland, yet he does not provide any formal evidence of it.

4. METHODOLOGY

4.1. *The switching regression model*

The switching regression model, first introduced by LEE (1978), has had many applications in the self-employment literature⁶ as this estimation procedure is particularly well

6. see REES and SHAH (1986) or DE WIT (1993a).

fitted to test the self-employment model presented in an earlier section. As seen previously, we assume that each individual has the choice between self-employment or wage employment and that this sectorial decision is mainly based on the expected income differential between these two forms of employment. Hence, the estimation procedure comes down to estimate the following structural equation:

$$I_i^* = \delta_0 + \delta_1(\ln Y_{sei} - \ln Y_{wsi}) + \delta_2 V_i - \varepsilon_i \quad (7)$$

where V is a vector of exogenous variables influencing the choice between self-employment and wage employment. As we cannot measure I^* while we can observe whether an individual is self-employed or salary worker, we define a qualitative binary variable:

$$I = \begin{cases} 1 & \text{if } \delta_0 + \delta_1(\ln Y_{sei} - \ln Y_{wsi}) + \delta_2 V_i \geq 0 \\ 0 & \text{otherwise} \end{cases} \quad (8)$$

This variable takes the value of 1 if the person is self-employed and 0 otherwise. Following LEE (1979) and MADDALA (1983), this equation can be estimated with the help of a probit model. However, we must first estimate the expected income of each individual in self-employment and wage work. We suppose that individual earnings are given by:

$$\ln Y_{sei} = X_i \beta_{se} + \varepsilon_{sei} \quad \text{if } I^* \geq 0 \quad (9)$$

for the self-employed, and

$$\ln Y_{wsi} = X_i \beta_{ws} + \varepsilon_{wsi} \quad \text{if } I^* < 0 \quad (10)$$

for wage or salary workers.

By assumption, ε_{sei} , ε_{wsi} and ε_i are distributed according to a trivariate normal distribution. The covariance matrix is:

$$\text{COV}(\varepsilon_{se}, \varepsilon_{ws}, \varepsilon) = \Sigma = \begin{bmatrix} \sigma_1^2 & \sigma_{12} & \sigma_{1\varepsilon} \\ \sigma_{21} & \sigma_2^2 & \sigma_{2\varepsilon} \\ \sigma_{1\varepsilon} & \sigma_{\varepsilon 2} & 1 \end{bmatrix}$$

If ε_i is correlated with ε_{sei} or (and) ε_{wsi} , we obtain biased estimates because:

$$E(\varepsilon_{sei} | I^* \geq 0) \neq 0 \quad (11)$$

and (or)

$$E(\varepsilon_{wsi} | I^* < 0) \neq 0 \quad (12)$$

This means we have to deal with a selection bias. The economic interpretation of the se-

lection bias is as follows: individuals choose their form of employment according to their ability so their earning will reflect their decision. Therefore, equations (9) and (10) cannot be estimated by ordinary least square. In order to correct the selection bias, we estimate the following earning equations:

$$\ln Y_{sei} = X_i\beta_{se} - \sigma_{1\varepsilon}(\phi_i/\Phi_i) + \mu_{sei} \quad (13)$$

$$\ln Y_{wsi} = X_i\beta_{ws} + \sigma_{2\varepsilon}(\phi_i/1 - \Phi_i) + \mu_{wsi} \quad (14)$$

where μ_{sei} and μ_{wsi} are the respective selectivity corrected residual terms with conditional expectations equal to zero, $\Phi_i = \Phi(Z_i\gamma)$ is the cumulative distribution of a standard normal random variable and $\phi_i = \phi(Z_i\gamma)$ is its density function. Z is the vector of the exogenous variables introduced in the reduced form selection equation and γ the vector of its corresponding coefficients. This model can be estimated either with a full information maximum likelihood method or with a two-step procedure. The latter consists in estimating first the reduced form equation with a binary probit model and then running the selectivity corrected earning equations which include the selectivity variable (also called inverse Mill's ratio). In a third step, we compute the expected income in each sector for each individual with the help of the coefficients of the selectivity corrected estimations. Finally, we estimate the structural equation (7) using once again a probit model. We have to mention that the two-step estimation procedure of the earning equations had to be preferred to the full maximum likelihood method because of collinearity problems.⁷

Following MADDALA, the selectivity variables coefficients provide valuable informations on the selection process. Depending on the sign of $\sigma_{1\varepsilon}$ and $\sigma_{2\varepsilon}$, we can determine if individuals are positively or negatively selected into self-employment. For example, if $\sigma_{1\varepsilon}$ were negative, it would mean that the average earnings of individuals with given measured characteristics who have chosen to become self-employed is in average greater than what self-employment earnings would be for those with the same measured characteristics who chose wage employment.

According to the model developed in section 2, we would expect individuals to be positively selected toward self-employment. Moreover, following the interpretation of BORJAS and BRONARS, self-employed individuals belonging to a wage discriminated group should have a comparative advantage in both self-employment and wage-work. In other words, this would mean that individuals that have the highest ability in the discriminated against group would choose self-employment.⁸

7. We test for collinearity by calculating the condition numbers for the regressors of (13) and (14). In each case, the condition number exceeds 20. Therefore, as proposed by Puhani (2000), the two-step estimation procedure had to be preferred.
8. This also means that the ability of the individual affects both the wage and the profits he/she can achieve. So, the BORJAS and BRONARS's model relaxes the very restrictive assumption of no correlation between individual profits and wages.

4.2. Probability decomposition

Following GOMULKA and STERN (1990), we investigate the differences in probability by carrying out the following decomposition:

$$\hat{P}^n - \hat{P}^d = \left[\bar{P}(\hat{\delta}^n, X^d) - \bar{P}(\hat{\delta}^d, X^d) \right] + \left[\bar{P}(\hat{\delta}^n, X^n) - \bar{P}(\hat{\delta}^n, X^d) \right] \quad (15)$$

or

$$\hat{P}^d - \hat{P}^n = \left[\bar{P}(\hat{\delta}^d, X^n) - \bar{P}(\hat{\delta}^n, X^n) \right] + \left[\bar{P}(\hat{\delta}^d, X^d) - \bar{P}(\hat{\delta}^d, X^n) \right] \quad (16)$$

where $\bar{P}(\hat{\delta}^i, X^j)$ is the average across the sample X^j of the predicted probabilities using the coefficient $\hat{\delta}^i$. In each expression, the first term between brackets is the contribution of coefficients while the second term is the contribution of observable characteristics. The difference between (15) and (16) is that in the first one, the coefficient contribution is measured relative to the characteristics of discriminated against individuals while in the second expression the characteristics of the fairly treated groups are used. As there is no ground to prefer one over the other we report estimates using both decomposition techniques.

5. DATA AND CHOICE OF VARIABLES

The data set used is the Swiss Labor Force Survey (SLFS). The SLFS is a representative phone survey conducted every year since 1991. In our study, the 1995 sample has been used as the sample was increased to 30000 observations that year. The sample was restricted to workers out of the agricultural sector, aged between 20 and 65 years old and who hold a permanent resident status. The database was further trimmed by deleting individuals completing compulsory military service, apprentice and family workers.

To test the self-employment model described in section 2, one has to build two vectors of explanatory variables. The first one will contain so called "choice variables" which affect the choice between self-employment and wage work but can also affect income. However, it is highly recommended to choose at least two variables that have an impact only on the choice between the two kinds of work and that are not correlated with income. The second vector will contain human capital variables that affect directly the income of individuals. By assumption, the incomes of self-employment and wage work are determined by the same set of variables. In order to get identified parameters, at least two human capital variables must not be included in the choice variable vector.⁹

We expect socio-economic variables like the number of children, marital status, geo-

9. see LEE (1979) for details.

graphical location, wealth or business cycles to affect the form of employment chosen by the individuals. In our specification, children and the marital status will allow us to test the impact of the family background on the self-employment choice. The variable “children”, which is broken down in three variables taking into account the age of the children, could also provide us with proxies for the age of the individual and for his/her attitude toward risk.

Unfortunately, individuals do not have to report wealth in the SLFS. So the effect of wealth on the probability of becoming self-employed has to be tested with a proxy. In our case, we created a binary variable taking the value of 1 if the individual is a home owner. We expect this variable to be positively correlated with self-employment if individuals are liquidity constraint. However, such a variable will only provide weak evidence of liquidity constraint. The reason lies in an endogeneity issue as, in our specification, it is not possible to determine if it is wealth that has an impact on the decision to become self-employed or if it is the status of the individual that has an impact on his level of wealth.¹⁰

We also aim to test the effect of business cycles. The relationship between self-employment and business cycles will depend on the respective strength of the so called “push” and “pull” factors. The push factor will act when labor market conditions are poor. High unemployment level will reduce wage job opportunities and force some individuals, for instance long-term unemployed, to start a self-employed activity. On the other hand, the pull factor will be observed when business prospects are good which will increase the expected income from a self-employment activity and reduce the risk of not finding a job in the case the venture fails. Of course, push and pull factors may act simultaneously on different groups of people. To test the effect of labor market condition on self-employment decision, we assign to each individual the unemployment rate of his canton of residence. Two other variables may provide a weak test of a push effect. The first one is the non-labor income of the individual in the sample. This variable is constructed by subtracting the individual income from the total income of the household. This variable takes into account the income of other members of the household as well as income coming from other sources than labor like, for example, capital. The other variable that may provide a test of the push effect is the binary variable indicating if the spouse works. Both variables (non-labor income and spouse working) may act the same way as they indicate whether a person is close or not to the boundary of its budget constraint. One can assume that if a person benefits from other source of income, he/she will have less incentive to become self-employed in a case of a “push” effect.

Finally we introduced a binary variable indicating if the individual is married to a self-employed person. Previous evidences in the literature (see section 3), focusing on women, have shown that a self-employed spouse increases significantly the probability of becoming self-employed. We also expect a positive impact of this variable on self-em-

10. The existence of liquidity constraint can be further challenged by the attitude toward risk. CRESSY (2000) shows that the correlation between assets and self-employment can be explained by income uncertainty and decreasing risk-aversion.

ployment for all the groups studied although we deleted from our sample the family workers.

The vector of income variables is composed of standard human capital variables like education, experience (age-education-6), tenure and a gender or citizenship dummy depending on which sample the estimation is run. The latter dummy variables are supposed to measure crudely the wage discrimination or earning penalty encountered by foreigners and women in wage work and self-employment. We also control for the unemployment rate (at the cantons level), the canton of residence (a swiss german canton dummy variable) and the industries affiliation by incorporating a set of sectorial dummies. Finally, the dependent variable of the earnings equations is the (log) of the hourly professional income.

6. RESULTS

Table 1 and 2 present the results of the estimations of selectivity corrected earning equations run on different subgroups of the Swiss workforce, i. e. native, foreigner, female and male workers. First, we can note that the magnitude and statistical significance of tenure is low when running an estimation on the self-employed samples. This holds true for all groups investigated. This result is consistent with the theory that attributes the return to tenure in the paid-job sector to principal-agent problems. As such issues do not exist in the self-employed sector, the tenure-income profile has to be much flatter in this form of work.¹¹ Interestingly, women suffer from a greater penalty in self-employment than in wage work. In the mean time, foreigners do not encounter any earning penalty in self-employment, this finding being verified as well in the men sample as in the female sample.

The selection process towards self-employment or wage work is similar between natives and foreigners. For both samples, the selectivity variables are not significant in the self-employment equations while they have a positive and statistically significant impact in the wage-work earnings equations. This means that both foreigners and natives are positively selected toward wage-work, i. e. the average earning of a foreigner or a native with given measured characteristics who has chosen to be an employee will be greater than the income in wage work of a self-employed person with the same measured characteristics. This also means that an individual who has chosen self-employment would earn less, in average, in wage work than a person with the same measured characteristics who has chosen to be an employee. This is a striking result which may be explained by the heterogeneity of the self-employed group which ranges from successful entrepreneurs to job market misfits. According to BORJAS and BRONARS, if we were in presence of wage-discrimination related push effect, we should have seen the discriminated against group to be negatively selected toward wage work which would mean that

11. see LAZEAR and MOORE (1984) for a more complete description of this problematic.

Table 1: Earning equations, SLFS 1995

	Swiss nationals		Foreigners	
	Self-employment	Wage-work	Self-employment	Wage work
Constant	0.9830*	1.3173*	2.1755*	1.4059*
	(0.3702)	(0.0501)	(0.7403)	(0.0874)
Education	0.0967*	0.0972*	0.0457	0.0774*
	(0.0157)	(0.0030)	(0.0277)	(0.0042)
Experience	0.0246*	0.0315*	0.0277	0.0270*
	(0.0106)	(0.0016)	(0.0236)	(0.0030)
Experience 2/100	-0.0263	-0.0540*	-0.0260	-0.0473*
	(0.0175)	(0.0032)	(0.0402)	(0.0061)
Tenure	-0.0023	0.0107*	0.0024	0.0096*
	(0.0061)	(0.0013)	(0.0222)	(0.0020)
Tenure 2/100	0.0094	-0.0123*	-0.0333	-0.0104*
	(0.0109)	(0.0032)	(0.0712)	(0.0039)
Gender (male = 1)	0.3569*	0.1530*	0.2914*	0.1377*
	(0.0600)	(0.0214)	(0.1263)	(0.0179)
Unemployment rate	0.0265	0.0275	-0.0652	0.0373*
	(0.0313)	(0.0055)	(0.0782)	(0.0107)
Swiss german canton	0.2043	0.1530*	-0.0439	0.1538*
	(0.1220)	(0.0214)	(0.3055)	(0.0410)
Selectivity variable	-0.0230	0.2321*	-0.0037	0.3211*
	(0.0750)	(0.0455)	(0.1539)	(0.0883)
Standard errors	0.7720	0.4147	0.7594	0.3980
Number of obs.	880	8287	189	2417
R2	0.1856	0.3475	0.1418	0.3438

Notes: Asymptotic standard errors (corrected for heteroscedasticity) between brackets.

Not reported: sectorial dummies estimates. *: significant at the 5 % level.

Table 2: Earning equations SLFS 1995

	Men		Women	
	Self-employment	Wage-work	Self-employment	Wage work
Constant	1.9121*	1.3417*	0.3707	1.4473*
	(0.4013)	(0.0599)	(0.6556)	(0.0648)
Education	0.0889*	0.0941*	0.0813*	0.0902*
	(0.0157)	(0.0033)	(0.0265)	(0.0035)
Experience	0.0155	0.0371*	0.0600*	0.0264*
	(0.0111)	(0.0020)	(0.0190)	(0.0019)
Experience 2/100	-0.0143	-0.0628*	-0.0874*	-0.0455*
	(0.0183)	(0.0040)	(0.0332)	(0.0040)
Tenure	0.0016	0.0093*	-0.0085	0.0116*
	(0.0075)	(0.0014)	(0.0108)	(0.0015)
Tenure 2/100	0.0073	-0.0106*	0.0141	-0.0130*
	(0.0173)	(0.0033)	(0.0160)	(0.0036)
Swiss	-0.0119	0.0787*	-0.0186	0.0821*
	(0.0846)	(0.0152)	(0.1981)	(0.0172)
Unemployment rate	-0.0316	0.0330*	0.0991	0.0254*
	(0.0327)	(0.0065)	(0.0587)	(0.0072)
Swiss german canton	0.0261	0.1705*	0.4362*	0.1160*
	(0.1282)	(0.0254)	(0.2283)	(0.0279)
Selectivity variable	0.0063	0.2706*	-0.0863	0.0064
	(0.0829)	(0.0533)	(0.1148)	(0.0659)
Standard errors	0.7218	0.4167	0.8528	0.3920
Number of obs.	740	6129	329	4575
R2	0.1270	0.3384	0.1832	0.2979

Notes: Asymptotic standard errors (corrected for heteroscedasticity) between brackets.

Not reported: sectorial dummies estimates. *: significant at the 5 % level.

wage-work attracts only individuals with the lowest ability. However, from our estimates of the selectivity variable, we cannot conclude that wage discrimination pushes foreigners into self-employment.

On the other hand, we observe a completely different selection process between men and women. The latter are positively selected (although the coefficient is not statistically significant) towards self-employment while there seems to be no selection at all toward wage work. In the mean time, men are positively selected toward wage work, and we cannot observe any selection process for this group toward self-employment. Likewise the selection process of foreigners, the selection process of women does not provide any strong evidence of a push effect due to labor market discrimination as self-employed women are not negatively selected toward wage-work.

The estimates of the choice equations are reported in Table 3 and 4. First, we note that the signs of the coefficients of the reduced form probit are most of the time similar across groups. For instance, the dummy indicating if an individual owns its domicile is positive and statistically significant throughout the groups which may indicate the existence of liquidity constraint. Self-employment is also positively correlated with education and experience in all groups. The coefficients attached to education challenge the signalling hypothesis. According to the latter, one would expect that those planning to enter self-employment have no need to acquire formal qualification to indicate their quality to potential employers which is not what we observe.

The results of the structural form probit equations are consistent with those of the reduced form equations. However, some coefficients switch from negative to positive and vice-versa. Taking explicitly into account the expected earning differential may induce some dramatic changes in the coefficient (see LEE (1978)). Indeed, the estimates of the reduced form probit give the net effects for the various factors on self-employment status. These effects are the results of cost and benefit consideration as well as selection and tastes towards self-employment. In the structural probit, the estimates are stripped off any reward considerations. So the coefficients of the structural equation only catch the tastes of individuals towards self-employment and the selection effects. This is the reason why, in the natives sample, the gender dummy switches from positive in the reduced form equations to negative in the structural form equations, which is consistent with our earlier result that showing that women are positively selected into self-employment. This also means that earning considerations may prevent Swiss women from entering self-employment.

In all groups studied, the most powerful factor determining the work status is the expected earning differential between self-employment and wage work. This is consistent with the theoretical self-employment model that states that individuals choose their work status on the basis of their expected income. So if wage discrimination were to disappear, one could not rule out a decrease of the propensity of becoming self-employed for women and foreigners, all other things being equal.

The family background is also one of the main factor determining the type of work chosen by workers. Our results show that the coefficients attached to the dummy vari-

Table 3: Reduced form estimates (Probit model)

	Men	Women	Natives	Foreigners
Constant	-2.9376* (0.2526)	-3.1320* (0.3637)	-3.0730* (0.2222)	-2.9203* (0.4652)
Education	0.1014* (0.0119)	0.0901* (0.0174)	0.0982* (0.0114)	0.0978* (0.0187)
Experience	0.0401* (0.0088)	0.0278* (0.0112)	0.0343* (0.0075)	0.0313 (0.0171)
Experience square	-0.0222 (0.0168)	-0.0035 (0.0211)	-0.0138 (0.0143)	-0.0086 (0.0335)
Tenure	-0.0162* (0.0058)	-0.0063 (0.0068)	-0.0159* (0.0047)	0.0006 (0.0164)
Tenure square	0.0172 (0.0138)	0.0215 (0.0122)	0.0291* (0.0101)	-0.0492 (0.0533)
Owner	0.2614* (0.0491)	0.1530* (0.0705)	0.2128* (0.0436)	0.2527* (0.1001)
Unemployment rate	-0.0138 (0.0279)	-0.0222 (0.0396)	-0.0061 (0.0249)	-0.0411 (0.0559)
Non-labor income	-0.0143* (0.0055)	-0.0026 (0.0069)	-0.0065 (0.0045)	-0.0230* (0.0096)
Swiss german cantons	-0.1855 (0.1078)	-0.0670 (0.1528)	-0.0994 (0.0962)	-0.2574 (0.2148)
Married	-0.1832* (0.0640)	0.1337 (0.0979)	-0.0827 (0.0565)	-0.1598 (0.1199)
Children (0–6 years)	0.0890* (0.0398)	0.2370* (0.0679)	0.1286* (0.0364)	0.0026 (0.0855)
Children (7–14 years)	0.1280* (0.0338)	0.2150* (0.0521)	0.1479* (0.0303)	0.1333* (0.0703)
Children (15–25 years)	-0.0156 (0.0471)	-0.0190 (0.0670)	-0.0222 (0.0418)	-0.0964 (0.0926)
Part-time	0.1342 (0.0938)	-0.1089 (0.0726)	-0.0026 (0.0598)	0.3024* (0.1219)
Swiss	0.1431* (0.0675)	0.3019* (0.1122)	-	-
Spouse working	0.0633 (0.0597)	0.0087 (0.1019)	0.0744 (0.0546)	0.1276 (0.1185)
Self-employed spouse	1.0616* (0.0914)	0.9234* (0.0910)	0.9828* (0.0700)	1.0710* (0.1500)
Gender (male = 1)	-	-	0.2225* (0.0543)	0.5015* (0.1085)
Number of obs.	6869	4904	9167	2606
χ^2	725.07	481.84	966.58	250.68

Note: standards errors between brackets. *: significant at the 5 % level.

Not reported: sectorial dummies estimates

Table 4: Structural form estimates (Probit model)

	Men	Women	Natives	Foreigners
Constant	-11.8702*	-1.4952*	-3.5025*	-7.3262*
	(0.5852)	(0.3323)	(0.4491)	(0.6765)
Education	0.2091*	0.0283	0.2359*	0.2125*
	(0.0205)	(0.0155)	(0.0230)	(0.0262)
Owner	0.7649*	0.2190*	0.7844*	0.2571*
	(0.0949)	(0.0674)	(0.0965)	(0.1331)
Unemployment rate	0.8402*	-0.1071*	0.0089	0.3287*
	(0.0592)	(0.0393)	(0.0534)	(0.0772)
Non-labor income	-0.0515*	-0.0022	-0.0536*	-0.0306*
	(0.0095)	(0.0067)	(0.0099)	(0.0129)
Swiss german cantons	1.7455*	-0.4323*	-1.2029*	0.4670
	(0.2037)	(0.1527)	(0.2105)	(0.2900)
Married	-0.1059	0.2687*	-0.2743*	0.0964
	(0.1108)	(0.0943)	(0.1205)	(0.1565)
Children (0–6 years)	0.2573*	0.1106*	0.6236*	-0.1757
	(0.0695)	(0.0626)	(0.0720)	(0.1152)
Children (7–14 years)	0.5612*	0.1290*	0.6893*	0.2564*
	(0.0610)	(0.0480)	(0.0624)	(0.0905)
Children (15–25 years)	0.3543*	-0.0459	0.2122*	0.0417
	(0.0913)	(0.0646)	(0.0866)	(0.1286)
Part-time	-0.4467*	-0.1174	-0.7294*	0.0117
	(0.1677)	(0.0693)	(0.1240)	(0.1420)
Swiss	1.1740*	0.4254*	-	-
	(0.1297)	(0.1098)	-	-
Spouse working	0.3637*	-0.1261	0.6384*	-0.0613
	(0.1109)	(0.0980)	(0.1222)	(0.1603)
Self-employed spouse	2.7164*	1.0306*	3.0565*	1.8080*
	(0.1655)	(0.0880)	(0.1585)	(0.2050)
Gender (male = 1)	-	-	-2.5223*	0.3395*
	-	-	(0.1560)	(0.1350)
Expected earning diff.	11.9654*	0.9727*	17.1907*	4.4176*
	(0.4482)	(0.1219)	(0.6545)	(0.2941)
Number of obs.	6869	4904	9167	2606
χ^2	3615.11	499.77	4798.58	725.24

Between brackets: standard errors. *: significant at the 5 % level.

able taking the value of one if the spouse is self-employed are among the largest and most statistically significant. As the family workers are not included in our sample, these estimates may attest to some social clustering related to the individual's professional choice. Moreover, our finding shows that a self-employed spouse not only increases the probability for women of being self-employed but also for men, natives and foreigners.

Estimates attached to the various "children" variables are rather similar across groups. For instance, having children aged between 7 and 14 years old increases the probability of becoming self-employed in all groups. Moreover, we do not observe any negative impact that is statistically significant related to the "children" variables. This might mean that self-employment is not perceived as a much riskier kind of activity. As for women, this could also indicate that self-employment is better fitted than wage work to those who want to pursue a professional career while educating children. Finally, the number of children could act as a proxy for the age of the individuals. So the estimated coefficients may indicate that younger individuals have more difficulties to become self-employed. This interpretation would be consistent with the liquidity constraint hypothesis. Indeed, if liquidity is binding, the self-employed would tend to be older as one would have to gather capital before starting his/her own activity.

While the local unemployment rate does not produce any significant impact in the reduced form estimations, this variable produces sizeable effects in the structural probit estimations. The inconclusive results obtained with the reduced form estimations are hardly surprising as the coefficients capture income effects (related to the "pull" factor) and taste effects (very likely related to the "push" factor) that may cancel each other out. As mentioned earlier, the structural probit estimates are stripped off any reward considerations. This means that the structural probit estimations should allow us to test directly the "push" effect. The unemployment rate produces a positive impact in the men and foreign samples which could indicate that these individuals are pushed into self-employment when labor market conditions deteriorate. This result is consistent with the coefficients of the non-labor income variable which are negative for all groups. This is an evidence of a push effect as people that dispose of an alternative source of income have a smaller chance of becoming self-employed. Yet, the impact of non-labor income is not statistically significant for women and this sample is the only one in which the unemployment rate does produce a negative impact on the probability of becoming self-employed. This group is probably the least susceptible to be hit by the "push" effect as women can often rely on other member of the household in regards of income. So, instead of being pushed into self-employment, women may rather drop out of the labor force in the case of an economic slump.

Table 5: Natives-foreigner self-employment decomposition

		Natives	%	Foreigners	%
Natives	Total	-	-	2.3091	100.00
	Coef.	-	-	1.7368	75.22
	Char.	-	-	0.5723	24.78
Foreigners	Total	-2.3091	100.00	-	-
	Coef.	-1.3515	58.53	-	-
	Char.	-0.9576	41.47	-	-

Table 6: Male-female self-employment decomposition

		Male	%	Female	%
Male	Total	-	-	4.0371	100.00
	Coef.	-	-	4.6658	115.57
	Char.	-	-	-0.6287	-15.57
Female	Total	-4.0371	100.00	-	-
	Coef.	-1.6954	42.00	-	-
	Char.	-2.3417	58.00	-	-

Finally, we carry out a probability decomposition to find out how much of the differences in the self-employment rates can be explained by different characteristics endowment or by different determinants (Table 5 and 6). The results show that differences in coefficients contribute for more than 50 % of the total difference in the self-employment rate between natives and foreigners. The probability decomposition of the difference between men and women give mixed results. Indeed more than 100 % of the total difference is explained by different determinants when we measure the differences due to the coefficients relative to the women characteristics. This number reduces to less than a half of the total difference when we compute the contribution of coefficient relative to men characteristics. However, unlike earning decompositions, where a coefficient effect is interpreted as discriminatory, we cannot interpret the coefficient contribution as an unequal treatment by the labor market. Indeed, the coefficient effect in this probit decomposition framework will not only reflect the labor market structure, but also the attitude of individuals to this. To overcome this interpretation issue, one should dispose of psychological or sociological variables that are unfortunately not available in most of the data sets used by researchers.

7. CONCLUSIONS

In this paper, we have investigated the determinants of self-employment in Switzerland focusing on differences between groups that experience wage discrimination and groups that are fairly treated on the job market. Estimating a switching regression model, we find that most of the groups (natives, foreigners and male) are positively selected towards wage-work. Only women show no selection towards wage work while they are positively selected to self-employment though the latter effect is not statistically significant. In the presence of wage discrimination, one would have expected to see discriminated against groups to be negatively selected to wage-work and positively selected to self-employment which holds only partially for women.

For the four groups scrutinized (male, female, natives and foreigners), the expected earning differential between self-employment and wage-work is the major factor explaining the work status. This would mean, that a decrease in wage discrimination could affect the level of self-employment. Indeed, as our results show that the opportunity cost of becoming self-employed does matter, an increase of this opportunity cost through less discrimination might reduce self-employment, all other things remaining equal.

The analysis of the structural probit estimates show that foreigners have a lower probability of becoming self-employed when we control for the expected earning differential. The estimates regarding women provide a rather blurry picture. Indeed, Swiss women experience a greater probability than Swiss men to work on their own once we control for the earning differential while the reverse holds true in the foreign sample. From our estimates, we can rule out any push effect due to labor market discrimination for the foreign workforce. However, such effect could partially explain female self-employment. Finally, when we decompose the probability of becoming self-employed between characteristics contribution and coefficients contribution, we observe that both characteristics and coefficients play a role in the gap in self-employment rate.

The evidence that wage discriminated groups are not pushed into entrepreneurship could be explained by many factors. Considering the foreign workers, institutional factors might largely explain our findings. One may also think of access to capital which may be harder for foreigners especially in the case of imperfect information in the credit market. In the mean time, consumer discrimination has to be ruled out as there seems to be no earning penalty for foreigners in self-employment. Women seem to be prevented from becoming self-employed by the bigger earning penalty they face in the self-employment sector. One can hypothesize that this income penalty in the self-employment may reside in sociological and psychological factors that cannot be captured by our data.

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SUMMARY

This paper investigates the determinants of self-employment in Switzerland, focusing on the differences between groups that are discriminated against on the wage-job market groups that are treated fairly. The main hypothesis is that members of discriminated against groups may go into entrepreneurship or self-employment in order to avoid the income penalty they face. We test the self-employment model with the help of a switching regression model for various groups in order to find out whether the selection process into self-employment is the same for discriminated against or fairly treated individuals. Our results show that foreigners are not negatively selected towards wage-work which challenges the existence of a "push" effect due to wage discrimination. In the mean time, women show a completely different selection process into wage-work and self-employment than men. However, we cannot conclude that discrimination pushes women into self-employment. Finally, we also examine whether differences in the rate of self-employment between groups can be explained by different characteristics endowments or by different determinants by carrying out a probability decomposition in a probit model framework.

RESUME

Le travail indépendant a souvent été perçu comme un moyen pour certains groupes de la population active comme les femmes ou les étrangers, d'éviter les discriminations auxquelles ils doivent faire face sur le marché du travail salarié. Notre étude vise à tester cette hypothèse à l'aide des données de l'enquête suisse sur la population active (ESPA) 1995 en estimant les déterminants du travail indépendant des femmes et des étrangers et en les comparant avec ceux de la population masculine ou suisse. Méthodologiquement, nous faisons appel au modèle à changement de régime. Celui-ci nous permet d'observer si le processus de sélection vers le travail indépendant est le même pour tous les groupes étudiés. Nos résultats montrent que les étrangers ne sont pas positivement sélectionnés vers le travail indépendant ce qui semble contredire la théorie qui voudrait que les individus souffrant de discriminations salariales soient poussés vers le travail indépendant. Dans le même temps, nous observons un processus de sélection totalement différent entre les hommes et les femmes. Toutefois, on ne peut affirmer que les discriminations salariales soit un facteur prédominant du travail indépendant féminin. Finalement, nous décomposons les différences de taux de travailleurs indépendants

entre les groupes en deux éléments, soit les différences dues aux caractéristiques et les différences dues aux déterminants du travail indépendant.

ZUSAMMENFASSUNG

Die selbständige Arbeit ist oft ein Mittel für einige Gruppen der aktiven Bevölkerung wie Frauen oder Ausländer, die Diskriminierungen zu vermeiden, denen sie auf dem bezahlten Arbeitsmarkt ausgesetzt sind. Unsere Studie zielt darauf ab, diese Hypothese mit den Daten der Schweizerischen Arbeitskräfteerhebung (SAKE) 1995 zu testen. Wir schätzen die Determinanten der selbständigen Arbeit der Frauen und der Ausländer, und vergleichen sie mit jenen der männlichen oder der Schweizer Bevölkerung. Methodologisch brauchen wir das „Switching regression model“. Dieses erlaubt uns zu beobachten, ob der Auswahlprozess in Richtung der selbständigen Arbeit für alle ausgearbeiteten Gruppen derselbe ist. Unsere Ergebnisse zeigen, daß die Ausländer nicht in Richtung der selbständigen Arbeit ausgewählt werden. Ausserdem beobachten wir auch einen ganz anderen Auswahlprozess zwischen Männern und Frauen. Allerdings kann man nicht behaupten, daß die Lohndiskriminierungen ein vorherrschender Faktor der weiblichen Selbständigerwerbenden sind. Schließlich zergliedern wir die Unterschiede zwischen den verschiedenen Gruppen von Selbständigerwerbenden in zwei Elemente, das heisst in die beobachtbaren Eigenschaften und in die Determinanten der selbständigen Arbeit.