## For Online Publication

# Job History, Non-Cognitive Skills, and Employability

# **Online Appendix**

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## 1 Analysis of NLSY97 Data

#### 1.1 Data

The National Longitudinal Survey of Youth 1997 (NLSY97) is a nationally representative sample of 9,000 Americans who were between the ages of 12 and 16 at the onset of the survey study; the latest wave was conducted between 2013 and 2014 and included more than 7,000 participants.<sup>1</sup>

**Outcome measures.** To study the relationship between frequency of job changes and measures of non-cognitive skills, we use the total number of jobs held since the age of 20 ("Jobs") as dependent variable. To analyze the relationship between number of previous jobs and current employment status, we use an indicator variable for being unemployed in October 2013 ("Unempl"), the last month for which data on all participants in the 2013 wave are available. As an additional outcome measure, we examine earnings from wages and salaries in 2012 ("Wages").

Measures of non-cognitive skills and personality. We constructed the variables "Break Rules" and "Work Hard" based on two sets of four questions each.<sup>2</sup> We also analyzed the variables "Drink at Work" (= 1 if a participant reported to have ever drunk alcohol at work) and Ever Arrested (= 1 if a participant reported to have ever been arrested by the police) as expressions of non-cognitive skills.<sup>3</sup> The 2007 wave additionally elicited the Big Five personality traits using the Ten Item Personality Inventory (TIPI). The corresponding variables are "Extraverted," "Agreeable," "Conscientious," "Emotionally Stable," and "Open to Experience."

**Covariates.** We include the following basic demographic and geographic control variables: age ("Age", in years in 2013), gender ("Gender"), dummies for ethnicity ("Ethn"), region dummies ("Region", i.e., Northeast, North, South, West), and a dummy for urban versus rural area ("Urban"). As measures of educational attainment we include dummies for highest academic degree achieved ("HDeg") and the (standardized) grade point average before leaving secondary school ("GPA").<sup>4</sup> We also include the total number of weeks a participant was employed since the age of 20 ("Empl"). Finally, we control for the month of the most recent interview ("Int-Month", dummies) because cumulative variables, such as the number of previous jobs, may be systematically higher for those who were interviewed at a later date.

<sup>&</sup>lt;sup>1</sup>The dataset is publicly available at https://www.nlsinfo.org/content/cohorts/NLSY97.

<sup>&</sup>lt;sup>2</sup>For Break Rules, we computed the average responses to the following questions: "I do not intend to follow every little rule that others make up;" "When I was in school, I used to break rules quite regularly;" "I support long-established rules and traditions;" "Even if I knew how to get around the rules without breaking them, I would not do it" (coding inverted for questions 3 and 4). For Work Hard, we took the average responses to the following questions: "I do not work as hard as the majority of people around me;" "I do what is required, but rarely anything more;" "I have high standards and work toward them;" "I make every effort to do more than what is expected of me" (coding inverted for questions 1 and 2). All responses use a 7-point Likert scale from "Disagree strongly" (= 1) to "Agree strongly" (= 7).

<sup>&</sup>lt;sup>3</sup>Drink at Work featured in different waves for different participants. Here, we pool these waves and code everybody who answered positively at least once as 1, the others as 0.

<sup>&</sup>lt;sup>4</sup>An alternative measure of academic skill is the Armed Services Vocational Aptitude Battery, a set of quantitative and verbal reasoning tests administered during the 1999 wave; all results are robust to using this measure instead of GPA.

#### 1.2 Number of previous jobs, non-cognitive skills, and personality

We ran separate regressions for each of the measures of non-cognitive skills and personality and adjusted the standard errors for multiple hypothesis testing using the Holm-Bonferroni method. To compare effect sizes, we standardized each measure to mean zero and standard deviation of 1. The dependent variable in each regression is the total number of Jobs held since the age of 20 (Jobs). In addition to the measures of non-cognitive skills and personality, we include the control variables Empl, HDeg, GPA, Age, Gender, Ethn, Region, Urban, and IntMonth.

Figure A.1 presents the results from this analysis. Individuals who are more likely to break rules, have been arrested by the police, and drink at work switch jobs significantly more often (p < 0.01) in each case).<sup>5</sup> Less conscientious labor market participants also switch jobs more often (p < 0.01). By contrast, hardworking individuals do not change jobs more frequently relative to others (p = 0.25). While emotional stability is unrelated to job switching (p = 0.24), being extraverted, agreeable, and open to new experiences is associated with a higher frequency of job changes (p < 0.01) in each case).



Figure A.1: Number of previous jobs, non-cognitive skills, and personality

OLS regressions of the number of job changes (Jobs) on measures of non-cognitive skills and personality traits controlling for Empl, HDeg, GPA, Age, Gender, Ethn, Region, Urban, and IntMonth. Each dot represents a separate regression for each of the measures of non-cognitive skills and personality. The number of observations (at the bottom) varies across regressions because of missing survey responses. The stars next to the dots indicate significance adjusted for multiple hypothesis testing using the Holm-Bonferroni correction. Significance levels: \*\*\* p < 0.01.

<sup>&</sup>lt;sup>5</sup>All p-values reported in this section are based on t-tests and the standard errors are corrected for multiple hypothesis testing.

# 1.3 Current unemployment status, labor earnings, and number of previous jobs

In this section we examine whether the number of job changes predicts current unemployment status as well as income from employment. We regressed current unemployment (Unempl) on prior number of jobs (Jobs), while including the covariates Empl, HDeg, GPA, Age, Gender, Ethn, Region, Urban, and IntMonth. Figure 1 in the main article shows that a higher number of jobs in the past is associated with a higher probability of being currently unemployed. Specifically, every additional job in a worker's employment history increases the probability of unemployment by 0.47 percentage points (p < 0.01). This relationship is present across a variety of subgroups. We also found that a higher number of previous jobs is negatively related to wage and salary income in the year before the 2013 wave (see Figure A.2). An additional job in the past is associated with \$1,504 lower annual income, on average (p < 0.01).<sup>6</sup> This relationship is also robust across different subgroups, although less pronounced for men than for women (p < 0.01).



Figure A.2: Current labor earnings and number of previous jobs

OLS regressions of the number of previous job changes (Jobs) on labor earnings controlling for Empl, HDeg, GPA, Age, Gender, Ethn, Region, Urban, and IntMonth. Each dot represents a separate regression for each of the subgroups. The numbers at the bottom indicate the size of the respective subsample. The stars next to the dots indicate significance. Significance levels: \*\*\* p < 0.01.

<sup>&</sup>lt;sup>6</sup>Our results are consistent with Audrey Light and Kathleen McGarry. 1998. "Job Change Patterns and the Wages of Young Men." *Review of Economics and Statistics* 80 (2): 276–286, who used the older NLSY79 panel to show that more frequent job changes are associated with lower earnings.

## 2 Laboratory Experiment: Subject Instructions

We reproduce the complete original instructions for the History condition. The only difference between the History condition and the No History condition was that the section "History Table" was removed for the No History condition. The experiment was conducted in English. Instructions follow the wording in Brown, Falk, and Fehr (2004).<sup>7</sup> Comprehension questions, exit questionnaire, and ztree files are available upon request from the authors.

 $<sup>^7\</sup>mathrm{Martin}$  Brown, Armin Falk, and Ernst Fehr. 2004. "Relational Contracts and the Nature of Market Interactions." Econometrica~72~(3):~747-780

# **Initial Instructions**

Thank you for participating in today's experiment.

I will read through a script to explain to you the nature of today's experiment as well as how to navigate the computer interface with which you will be working. I will use this script to make sure that the information given in all sessions of this experiment is the same. Please follow the instructions carefully.

In addition to a 10 CHF payment that you receive for your participation, you will be paid an amount of money that you accumulate from the decision task that will be described to you in a moment. The exact amount you receive will be determined during the experiment and will depend on your decisions and the decisions of others. You will be paid privately, in cash, at the conclusion of the experiment.

All monetary amounts you will see in this experiment will be denominated in ECUs or Experimental Currency Units. We will convert ECUs into CHF at the rate of

#### **1 ECU = 0.05 CHF**.

If you have any questions during the experiment, please raise your hand and wait for an experimenter to come to you.

*Please do not talk, exclaim, or try to communicate with other participants during the experiment.* 

Do not use the computer in a way not specified by these instructions or by the experimenters.

Participants intentionally violating the rules may be asked to leave the experiment with only their participation payment.

# **Basic Information**

#### Number of Periods:

The experiment is divided into periods. In each period you have to make decisions, which you will enter in a computer. There are **30 periods** in total.

#### **Buyers and Sellers:**

In this room there are 34 participants. Participants will be split into two independent groups of 17 participants each. For the rest of the session, you will only interact with the other 16 participants in your own group. You will not interact with the other 17 participants in any way.

The 17 participants in your group have been randomly divided into 2 roles: buyers and sellers. These roles are fixed, that means each buyer will remain a buyer, and each seller will remain a seller for the entire experiment. Whether you are a buyer or a seller is displayed on the computer screen. Please raise your hand if you do not see where the screen tells you whether you are a buyer or a seller. **There are 7 buyers and 10 sellers**.

#### **Identification Number:**

All participants have received an **identification number (ID)**, which they will keep for the entire experiment. Your identification number is displayed on the computer screen.

# **An Overview of the Experiment Procedures**

In each period of the experiment every buyer can trade a product with one seller. The seller earns a profit through the trade when he sells the product at a price that exceeds his production costs. The buyer earns a profit through the trade when the price he pays for the product is less than what it is worth to him. How high the production costs are for the traded product, and how much the product is worth to the buyer both depend on the quality of the product. We will describe below how the quality of a product is determined.

Each of the 30 periods is structured as follows:

#### 1. Trading Phase

Each period commences with a **trading phase**, which lasts 2 minutes. During this phase buyers can submit trade offers that can be accepted by sellers.

When submitting an offer a buyer has to specify **three things**:

- Which **price** he offers to pay
- Which product **quality** he desires
- To which seller he wants to submit the offer.

Buyers can submit two types of offers: private offers and public offers.

- **Private offers** are submitted to one seller only and can only be accepted by that seller.
- **Public offers** are submitted to all sellers and can be accepted by any seller.

A buyer can submit as many offers as he likes in each period. Sellers can accept submitted offers at any point. **Each buyer and each seller can only enter one trade agreement in each period.** As there are 7 buyers and 10 sellers, in each period there will be some sellers who will not trade.

#### 2. Quality Choice

Following the trading phase each seller who has entered a trade agreement then determines which quality of product he will supply to his buyer. **The seller is not obligated to supply the product quality desired by his buyer.** Once every seller has chosen which product quality to supply, the ECUs gained by each participant in that period have been determined. After this the next period begins.

The ECUs gained in all 30 periods are summed up at the end of the experiment, exchanged into CHF and paid together with the initial 10 CHF in cash.

# **The Experiment Procedures in Detail**

There are 7 buyers and 10 sellers in the experiment. Your role is fixed throughout the experiment. During the experiment you will enter your decisions on a computer screen. In the following we describe in detail how you can make your decisions in each period.

### The Trading Phase

Each period commences with a trading phase. During the trading phase each buyer can enter into a trading agreement with one seller. In order to do this each buyer can submit as many trade offers as he wishes.

#### **Buyer's Screen**

In each trading phase, buyers will see the following screen:

- Period	1 of 1								Re	maining Time [sec]: 101
History Table										
Bruce	Public Offers	Den svelity	Dring	Your private offers	to College		Your lo	dentification Numbe	r -1	
Buyer	Рпсе	Req. quality	Price	Req. quality	to Seller			Make your offer	rs here	
Public	Offers T	<b>Table</b>	Privat	e Offers T	<b>Fable</b>	Г 1 Г 6 Ур	If priva	Ite, to which Seller? Your price Requested quality I 3 8 Xour price	C public C private	Сок Сок Сок Сок Сок Сок
						Yo	ur Seller	Your pric	e	Your req. quality

In the top left corner of the screen is the current period of the experiment. In the top right corner of the screen is the time remaining in this trading phase, displayed in seconds. **The trading phase in each period lasts 2 minutes** (= 120 seconds). When this time is up the trading phase is over. Subsequently, no further offers can be submitted or accepted for the period.

#### **Buyer's Screen: Making an Offer**

Once the buyers see the above screen displayed the trading phase commences. Each buyer now has the opportunity to submit trade offers to the sellers. In order to do so they have to enter three things on the right hand side of the screen:

- 1. Offer Type
- 2. Price
- 3. Desired Quality

#### 1. Offer Type

First the buyer has to specify whether he wants to submit a public or private offer:

- **Public trade offers** will be communicated to all participants in the market. All sellers see all public offers on their screens. A public offer can therefore be accepted by **any seller**. Each buyer will also see all public offers submitted by other buyers. To submit a public offer, a buyer clicks on the field "public" when making an offer, **and enters "0" in the field "to which Seller"**.
- **Private trade offers** are submitted to **one seller only.** Only this seller will be informed of this offer and only this seller can accept that trade offer. No other seller or buyer will be informed about that offer. To submit a private offer, a buyer clicks in the field "private" when making an offer and then specifies **to which seller** he wants to submit the offer in the field below. Each of the 10 sellers has an identification number (seller 1, seller 2, ..., seller 10). Each seller keeps his identification number for the entire course of the experiment. To submit an offer to a specific seller, the buyer enters the number of that seller (e.g. "5" for seller 5).

#### 2. Price

Once the buyer has specified to whom he wants to submit an offer, he must determine **which price to offer.** He enters this in the field "your price". The price must be an integer and cannot be below 0 or above 100:

#### $0 \le \text{price offered} \le 100$

#### 3. Desired Quality

Finally, a buyer has to specify which product quality he desires. He enters this in the field "desired quality". The **desired quality** must be an integer and cannot be lower than 1 or higher than 10.

#### $1 \leq desired \ quality \leq 10$

After a buyer has completely specified a trade offer, he must click on the "ok" button to submit it. As long as he has not clicked "ok", he can change the trade offer. After he has clicked "ok", the offer will be displayed to all sellers to whom the buyer has submitted the offer.

#### **Buyer's Screen: Open Offers**

On the left side of the buyer's screen are the "**public offers**". All public offers in the current trading phase are displayed here. Every buyer can see which buyer submitted the offer, which price he offered and which quality he desired. All buyers also have an identification number, which they keep for the whole course of the experiment.

In the middle of the buyer's screen, under "**your private offers**", each buyer will see all his private offers he has submitted in the current trading phase. He can see to which seller he submitted an offer, which price he offered and which quality he desired.

Each buyer can submit as many private and public offers as he wishes in each period. Each offer that he submits can be accepted at any time during the trading phase.

**Each buyer can enter only one trade agreement in each period.** Once one of his offers has been accepted he will be notified which seller accepted which of his offers. In the bottom right corner of the screen the identification number of the seller will be displayed as well as the buyer's offered price and desired quality. Because each buyer can enter only one trade agreement in each period, all his other offers will be automatically cancelled. Also, he will not be able to submit any further offers.

No seller can enter more than one trade agreement in each period. Buyers will be constantly informed which sellers have not yet accepted a trade offer. In the bottom right corner, they will see 10 fields. Once a seller has accepted an offer, an "x" will appear in the field next to his identification number. Buyers cannot submit private offers to a seller who has already entered a trade agreement.

Once all buyers have entered a trade agreement or after the 2 minutes are up, the trading phase is closed by the computer.

No buyer is obligated to submit trade offers, and no seller is obligated to accept a trade offer.

#### Seller's Screen

During the Trading Phase, sellers will see the following screen:



This screen is similar to the buyer's screen and contains information about the current period, remaining time for trading, and currently open public offers from all buyers. The screen also shows all private offers that are made to this particular seller. A seller cannot see private offers that are made to other sellers. Every offer that is shown on the screen contains the buyer's ID, the offered price, and the desired quality.

Each seller can accept at most one offer. To accept a private offer, the seller clicks the row of the offer he wants to accept and confirms by clicking the "**accept**" button under the list with the private offers. To accept a public offer, the seller clicks the row of the offer he wants to accept and confirms by clicking "**accept**" under the list with the public offers.

As long as the seller does not click "accept", he can change his decision by clicking on a different offer. As soon as the seller has pressed the "accept" button he will see which offer he has accepted in the bottom row of the screen.

**Each seller can enter only one trade agreement in each period.** Once a seller has accepted one offer he cannot accept any further offers.

### **Choice of Product Quality**

Following the trading phase, all sellers who have entered a trade agreement then determine which product quality they will supply to their respective buyers. **The product quality that the buyer desired in his trade offer is not binding for his seller.** His seller can choose the exact quality the buyer desired, but he can also choose a higher or lower product quality.

#### Seller's Screen

The seller's screen looks like this:

You accepted the follow	ving offer
from Buyer	
Price	
Requested quality	
Determine the actual quality	
	ОК

The seller enters the quality and clicks "ok". The product quality the seller chooses has to be an integer between 1 and 10.

#### $1 \leq product quality \leq 10$

#### **Buyer's Screen**

While the seller determines the actual product quality, we ask the buyer to specify which quality he expects the seller to supply on a separate screen. In addition we ask him to state how sure he is of this expectation.

#### How are the incomes calculated?

The incomes of all buyers are determined in the same way and the incomes of all sellers are also determined in the same way. Each buyer can therefore calculate the income of his seller and each seller can calculate the income of his buyer. Further, each buyer and seller is informed of the identification number of his trading partner in each period.

Please note that buyers and sellers can incur losses in each period. Any loss you incur has to be paid from your initial sum of money or from earnings in other periods.

#### **Buyer Income:**

If a buyer does not enter a trade agreement during a trading phase he gains an income of 0 ECUs for that period.

If one of a buyer's trade offers is accepted, his income depends on which price he offered and which product quality his seller supplied to him. His income will be determined as follows:

Buyer's Income =	= 10*Product	Quality – Price
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As can be seen from the above formula the buyer's income is higher, the higher the product quality actually supplied by his seller. At the same time his income is higher, the lower the price he paid for the product.

#### Seller Income:

If a seller has not entered a trade agreement during a trading phase he gains an income of 5 ECUs for that period.

If a seller has accepted a trade offer, his income will be equal to the price he receives minus the production costs he incurs for the product quality supplied. The income of the seller is determined as follows:

#### **Seller's Income = Price – Production Costs**

The production costs of a seller are higher, the higher the quality of the product he chooses. The production costs for each product quality are displayed in the table below:

Product Quality	1	2	3	4	5	6	7	8	9	10
Production Costs	0	1	2	4	6	8	10	12	15	18

As can be seen from the above information the seller's income is higher, the higher the price that he accepted. Further, his income is higher, the lower the product quality he supplies to the buyer.

#### Income Screen:

You will be informed of your income and the income of your respective buyer/seller on an "**income screen**". On this screen the following information will be displayed:

- Which buyer/seller you traded with
- Which price you offered/accepted
- The desired quality by the buyer
- The product quality supplied by the seller
- The income of the buyer and the seller in this period

After the income screen has been displayed, the respective period is concluded, and the trading phase of the following period begins. Once you have finished studying the income screen please click on the "next" button.

## **History Table**

Period	Seller 1	Seller 2	Seller 3	Seller 4	Seller 5	Seller 6	Seller 7	Seller 8	Seller 9	Seller 10
1	2	-	1	4	-	5	7	3	-	6
2	3	7	-	-	2	5	6	-	1	4
3	-	7	-	6	2	-	1	3	4	5

At any time during the experiment, you will be able to see a history table. This table lists the trade partners for every trade that has occurred in the past. You can see the first few rows of a buyer's table above. Each row of this table corresponds to a period of the experiment. The number of the period can be seen in the leftmost column. Each column of the table represents a seller. The IDs of the sellers are shown in the top row. The cells of table for a particular seller show the buyer with whom that particular seller traded in the respective period. For example, in the sample table, seller 5 traded with buyer 2 in period 3. Remember that there are more sellers than buyers, so that in each period, some sellers will not trade. In the history table, this is indicated by a dash ("--").

The seller's history table looks identical, but the columns here represent the buyers.

## **Trade Restriction**

At a randomly determined period, which will be between period 10 and period 20, a "**trade restriction**" will come into action. This restriction prevents any buyer from making private offers to the seller with whom he traded in the period before the restriction came into action. Likewise, any seller will be prevented from accepting public offers from the buyer with whom he traded in the previous period. For example, if buyer X traded with seller Y in period 14, and the trade restriction starts in period 15, then buyer X and seller Y will not be able to trade any longer after this period. The following rules apply:

- The period when the trade restriction comes into action is **not known in advance**
- The trade restriction applies only to the buyer/seller with whom you traded in the **period immediately before** the trade restriction came into action; all other buyers/sellers will still be available
- Once the trade restriction comes into effect, you will not be able to trade with this buyer/seller for **all remaining periods** of the experiment
- A buyer cannot select his "restricted" seller for a private offer
- A seller cannot see or accept any public offers from his "restricted" buyer

The experiment will not commence until all participants are completely

familiar with all procedures. In order to make sure that this is the case we ask you to answer a couple of questions that will be displayed on the computer screen. Following these questions we will begin the experiment, which will last for 30 periods.

Do you have any questions?

# 3 HR Survey: Questionnaire

The original version of the HR survey was in German. Below is an English translation of the survey.

German original	English translation
kaufmännisch erfahren	commercially experienced
zuverlässig	reliable
teamfähig	able to work in teams
selbständig	self-directed
bereit sich anzupassen	willing to adapt
fähig	skilled
ehrlich	honest
zielorientiert	goal-oriented
vielseitig begabt	multi-talented
geduldig	perseverant

Table A.1: German and English terms for the applicant characteristics



# HR Survey

Imagine that your company has open positions for commercial jobs. You are involved in the recruiting procedure and have to evaluate different candidates. Among the applications are the following two candidates.

Please take some time and examine the two resumes, and then answer the following questions.

[The resumes of the candidates were labeled A and B and presented side-by-side in counterbalanced order]



#### 1. Characteristics of the candidates

Please evaluate the following characteristics of the candidates on a scale from 1 (does not apply at all) to 7 (fully applies):





# 2. General questions

12.	How likely would it be for you to invite the respective candidate to a job interview, on a scale from 1 (very unlikely) to 7 (very likely)?	Very likely   7   6   5   4   3   2   1   Very unlikely	
13.	Which aspects of the resumes did you notice in particular?		
14.	Are you actively involved in the evaluation of job candidates in your everyday activities?	□ Yes	□ No
15.	How many resumes do you evaluate in a typical month?		per month
16.	How many years of experience do you have in HR?		years
17.	Please indicate your gender	□ female	□ male
18.	Please indicate your age	<ul> <li>□ &lt; 25</li> <li>□ 25-35</li> <li>□ 36-45</li> </ul>	□ 46-55 □ > 55

# Thank you very much for your participation!