Evaluating the long-term impacts of economic or policy shocks among necessity and opportunity entrepreneurs

Emilio Congregado, Nicola Rubino, David Troncoso

28/06/2022

Our paper....

- ...follows current literature trends in self-employment, looking for persistence in self-employment time series
- **Opportunity entrepreneurs**: salarymen switching to self-employment, given the upturn of the economic cycle
- **Necessity entrepreneurs**: salarymen switching to self-employment, given the downturn of the economic cycle
- Punctual definition: **Fairly and Fossen (2017)**
- Our question: is there some degree of persistance in the two measures? is it nonlinear w.r.t to time?

Data

- Source: EPA. We use new data at the regional level and across sectors
- Initial Panel contains, after adjustment, 11.849.287 entries
- Necessity entrepreneur in quarter t transitions to self-employment state between quarters t and $t+1$, **conditional on being non employed in quarter t**
- Opportunity entrepreneur in quarter t experiences a transition towards self-employment state between quarter t and $t+1$, **conditional on being employed but not self in quarter t**
- Period by period summation, quarters, 2000/1 - 2020/4

Methodology

- **ADF type test equation with an attractor to test for different speed of return to unconditional mean**
- Perron-Vogelsang and Clemente et al. UR test against 1 and 2 breaks
- Ex-ante Panel time series linearity vs gen. nonlinearity test (a la Hansen)
- Threshold analysis with Information Criteria based selection against linear model (a la Tong (1981), ex post check)
- Finally, Markov exercise to check for persistence across states
- **Educated guess: transition regression speed dominated by level of unemployment (1 or 2 regimes)**

$$\Delta nec_t = c + \lambda nec_{t-1} + e_t$$

UR testing

- Unit root testing with a nested alternative of a break in the level/constant :

$$nec_t = \mu + \theta DU_t(T_b) + \lambda nec_{t-1} + \Sigma_{j=1}^{k} c_j \Delta nec_{t-j} + w_t$$

- Common test in literature. To accomodate shift in data and avoid data mining, extension to second deterministic break in levels (Clemente, Montanyes, Reyes):

$$\begin{aligned} nec_t &= \mu + \theta_1 DU_{1,t}(T_{a,t}) + \theta_2 DU_{2,t}(T_{b,t+s}) + \lambda nec_{t-1} + \\ &\quad \Sigma_{j=1}^{k} c_j \Delta nec_{t-j} + w_t \end{aligned}$$

UR testing I: national level time series

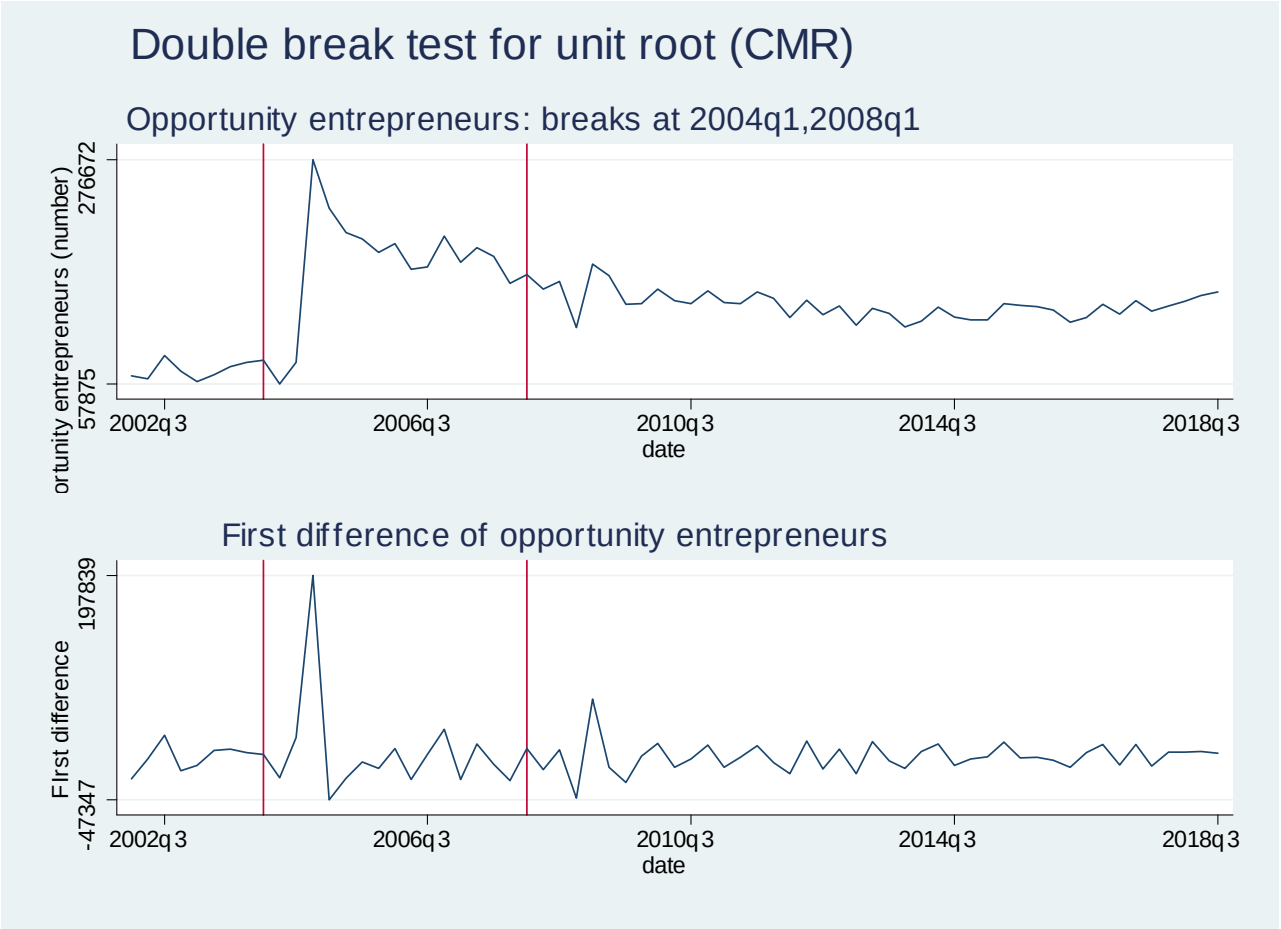
- We focus on the additive outlier model, since the break is sudden and not affected by the dynamics of the series as it is systematic given our data:

Table: Unit Root tests, one and two break alternative, TS

	t	*Break 2 p-value*	*Break 2 p-value*	*5 % critical value*
nec_t				
AO 1 break	-2,27*	0,00		-3,56
AO 2 breaks	-4,38*	0,00	0,00	-5,49
opo_t				
AO 1 break	-2,24*	0,00		-3,56
AO 2 breaks	- 2,94*	0,00	0,00	-5,49

Unit root tests. P values of the endogenously retrieved breaks reported. One and two breaks hypothesis.

UR testing II: 2 breaks opportunity



UR testing III: robustess. Panel UR tests

- Panel unit root tests (first and second generation tests, ccd taken into account in the second ones) to countercheck results of time series testing.
- Hadri's stationarity test chosen as it takes CCD into account as well as heterogeneous alternatives (all c.s. are stationary vs some cross sections contain unit roots).
- Adecuate to our set up (17 different autonomous regions with different economic structures): considers homogeneity across regions members of the country rather than time variation.

Table: Unit Root tests, homogeneous alternative, CSC and heteroskedasticity, Panel

	Null	*Heteroskedasticity*	*CSS*	*Statistic*	*p-value*
(I)	(II)	(III)	(IV)	(V)	(VI)
opo_t	Stationarity	Robust	Robust	16,10*	0,00
nec_t	Stationarity	Robust	Robust	22,26*	0,00

Hadri's Panel unit root tests. Following the Dickey and Pantula approach, first differences are tested first. Upon non rejection of the null hypothesis, the test stops, otherwise it continues to levels.

Panel Linearity Testing

Whole panel pre-test. Test equation contains smoothing component:

$$\Delta nec_{i,t} = \alpha_i + \lambda_t + \beta_1^{'} nec_{i,t-1} + (\beta_2^{''} nec_{i,t-1}) * G(u_{i,t}; \gamma; \theta) + \varepsilon_{i,t}$$

Test requires substituting $G(s_{i,t}; \gamma; c)$ with its first order Taylor expansion centered around $\gamma = 0$. (Hansen extended to Panel):

$$y_{it} = \mu_i + \beta_0^{'*} x_{it} + \beta_1^{'*} x_{it} q_{it} + ... + \beta_m^{'*} x_{it} q_{it}^m + u_{it}^*$$

with its null:

$$H_0 : \beta_1^{'*} = ... = \beta_m^{'*} = 0 \simeq H_0 : \gamma = 0$$

Results on the linearity tests with a generic alternative

Table: Linearity tests against one or two regime models. Alternative tests.

nec_t	m	$LM(x)$	p-value	$LM(F)$	p-value	$HAC(X)$	p-value	$HAC(F)$	p-value
	0vs1	8,303	0,004	8,190	0,004	3,461	0,063	3,414	0,065
	0vs2	12,420	0,002	6,120	0,002	3,470	0,176	1,710	0,181
opo_t	m	$LM(x)$	p-value	$LM(F)$	p-value	$HAC(X)$	p-value	$HAC(F)$	p-value
	0vs1	16,250	0,001	16,030	0,001	3,396	0,065	3,350	0,067
	0vs2	16,370	0,001	8,066	0,001	4,862	0,088	2,396	0,091

Heteroskedasticity consisent LM and F tests.

Three and two regimes unrestricted tar Model

Unrestricted, **three regimes TAR**, but with an ADF spec.:

$$\Delta nec_t = \begin{cases} c_1 + \lambda_l nec_{t-1} + e_t \text{ if } u_t \leq \theta_l \\ c_2 + \lambda_m nec_{t-1} + e_t \text{ if } \theta_l \leq u_t \leq \theta_h \\ c_3 + \lambda_h nec_{t-1} + e_t \text{ if } u_t \geq \theta_h \end{cases}$$

- Model collapses to $\Delta nec_t = \rho nec_{t-1} + e_t$ if $\theta_l = \theta_m = \theta_h$, with $\lambda_l = \lambda_m = \lambda_h$
- With nec_t necessity entrepreneurs at time t, u_t unemployment level, θ threshold value of u, e_t hopefully (i.i.d.)

Results I

Opportunity entrepreneurs:

Table: Half-lives estimates, AR(1) and BEST TAR

	$ADF(1)$	TAR		
	λ	$\lambda_{l,quarters}$	$\lambda_{m,quarters}$	$\lambda_{h,quarters}$
Δopo_t		-0.55*	-0.31	-0.77*
		(0.10)	(0.18)	(0.27)
Δopo_t				
	-0.23*			
	(0.07)			

Half-life estimates of the attractors/error correction parameters, calculated according to $\lambda^T = (1-x)/(1-\lambda)$. Columns (4), (V) and (VI): estimates for the best BIC performing TAR model.

- The increase in the speeds of adjustment follows a very similar story when low and high states of unemployment are compared (-0.55* to -0.77*).
- ...But self employment is not seen as an opportunity when unemployment follows its natural rate.**Those who seek opportunities do not switch to self-employment when unemployment is around its steady state.**

GDP as a Threshold

Table: Opportunity workers, lagged GDP as threshold, all fitted models

	ρ_l	ρ_m	ρ_h	ρ_{linear}
Andalucia	-0,945*	-2,693*	-0,328*	
Catalonia	-0,142*	-0,660*	-1,364*	
Valencian Community	-0,330*		-0,612*	
Region of Murcia	-0,499*		-1,335*	
Spain	-0,366*	-0,792*	-0,311*	

Estimates for the best BIC performing two, three regime TAR or linear model. * indicates significant estimates at 5 percent.

- Nonlinear representation always accepted
- **Even close to natural un. rate, adjustment (thus hysteresis) is generally present.**
- Low regime convergence generally faster than with unemployment as a threshold, once one period lagged GDP is used
- Not informative of pro or anticiclicality yet! (only considers relative speed of adjustment)

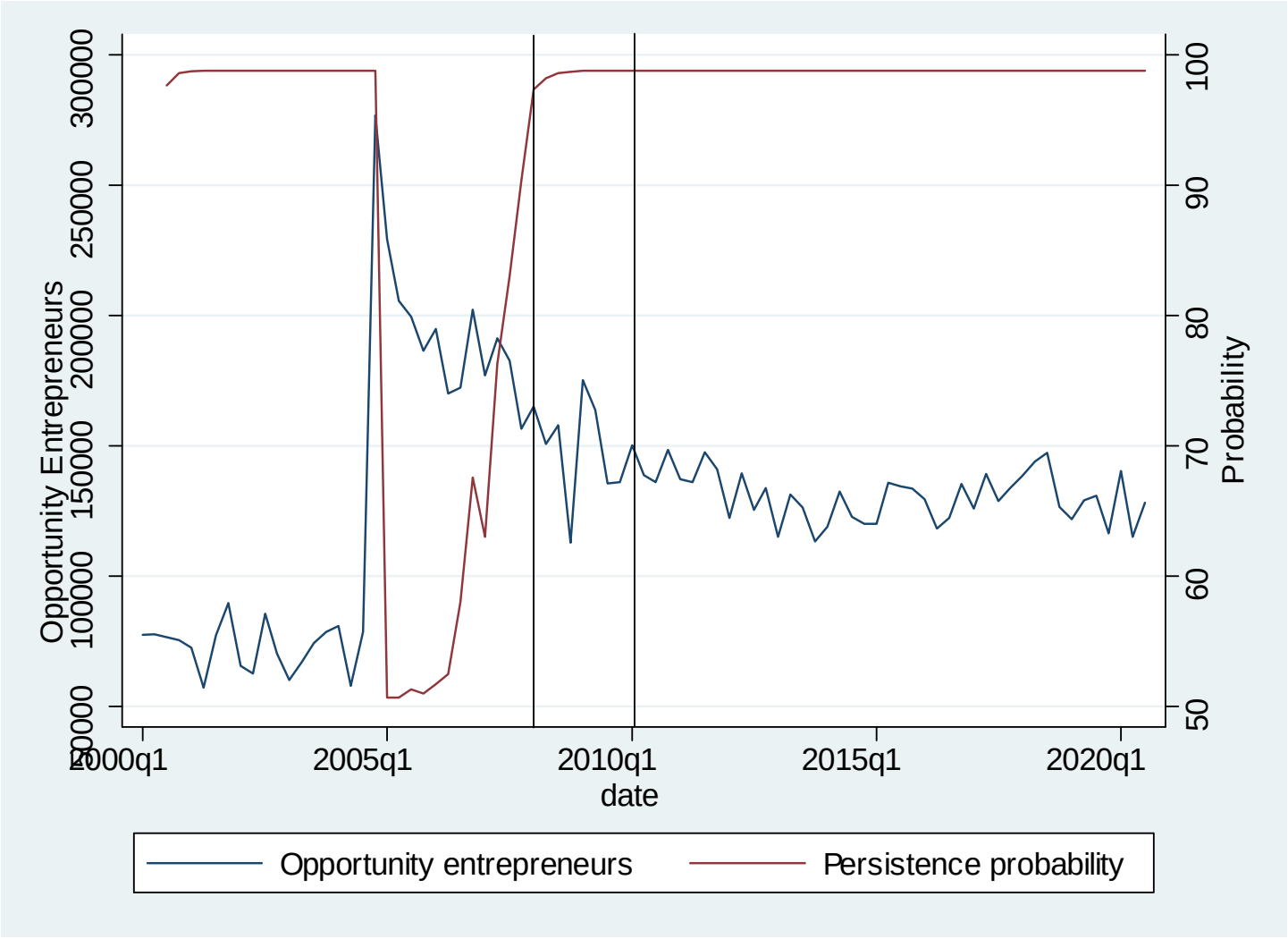
Markovian Analysis

- First/second order, two states autoregressive Markov Switching Model (ARMS(1/2)) employed to test for persistency of self-employment statuses

$$y_t = \mu_{s_t} + \phi_{1,s_t}(y_{t-1} - \mu_{s_{t-1}}) + \varepsilon_{s_t}$$

- where ϕ_{1,s_t} is the state-dependent autoregressive coefficient, μ_{s_t} the state dependent mean and ε_{s_t} a contemporaneous, state varying i.i.d error.

Markovian Analysis II



Markovian Analysis III

- Probability of staying in a low numerosity state from one time point to another is very high on average (from 96,5% to 98,8%)
- Probability to transition back from a high numerosity state to a low numerosity state is comparatively lower (from 50,7% to 72,3%)
- The average numerosity of the opportunity entrepreneur group appears to be quite constant across the two states.

Markovian Analysis IV

Table: ARMS(1/2) for opportunity entrepreneurs, Spain

	Linear	*MS – Variance*	*MS – Weights*
$\mu_{s=1}$	133929,700	116725,100	137193,700
	(17242,510)	(12591,060)	(4479,28)
$\mu_{s=2}$	249679,600	137413,300	139316,100
	(21292,310)	(18000,29)	(94868,432)
$p_{1\rightarrow 1}$	0,988	0,965	0,966
	(0,012)	(0,026)	(0,024)
$p_{2\longrightarrow 1}$	0,507	0,668	0,723
	(0,351)	(0,312)	(0,261)
SBIC	23,064	22,543	22,502

Markov application with lag and states for the linear (I), Variance switching (II) and Time weights switching (III) models. Standar errors in parenthesis.

Thank you!

Thank you for your patience!