On the disentanglement of an economic union

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Motivation

- The relationship between UK and the EU experienced an underlining tension for several years.
- From the decision to keep the British pound sterling and not joining the Eurozone to the eventual withdrawal from the EU.
- A recent report from ReWAGE and the Migration Observatory at the University of Oxford has shown that the labour mobility restrictions introduced by Brexit have contributed to the current labour shortages in the UK.
- Brexit poses itself as the perfect scenario to study the effects of the disintegration of economies (Carvalho & Schmitz, 2022).

Therefore, how does the disentanglement of an economic union affect the spatial distribution of economic activity and the welfare of the workers?

Literature

- Commendatore et al. (2021) focus on the disintegration effects and how the regions that remain integrated may move closer together.
- Javorcik et al. (2019) explore how Brexit affects the labour market and conclude that circulation restrictions can potentially be more harmful than trade barriers.
- Brakman et al. (2018) study how the UK can minimise losses due to Brexit and conclude that the solution would be a trade agreement with the EU.
- Dhingra et al. (2017) explore the welfare effects of Brexit and conclude that every party loses, but that it is the UK that is the biggest loser. Sampson (2017) also shares this opinion.
- Mossay and Tabuchi (2015) conclude that a Preferential Trade Agreement increases the welfare of its members while reducing that of left-out regions.

Economic model

- Quasi-linear log model with three regions (Gaspar et al., 2018; Pflüger, 2004),

$$U = \mu \ln M + A.$$

- There is a mass L of unskilled workers that are immobile between regions, and a mass H of skilled workers that are mobile between the three regions.

- The agricultural good has no transportation costs, the agricultural market is perfectly competitive and wages are normalized to 1.

- The industrial good has transportation costs (τ), the industrial market is monopolistically competitive and wages in region i are $w_i(h)$.

- $\phi \equiv \tau^{1-\sigma} \in (0, 1]$ represents the freeness of trade regarding the industrial good.

Economic model

- The indirect utility of an agent in region i is

$$V_i(\boldsymbol{h}) = w_i(\boldsymbol{h}) - \mu \ln P_i(\boldsymbol{h}) + \eta.$$

- Agents' migration decisions are governed by the replicator dynamics (Sandholm, 2010),

$$f_i = \dot{h}_i \equiv h_i \left(V_i(\boldsymbol{h}) - \bar{V}(\boldsymbol{h}) \right), \quad i = \{1, 2\},$$

where $\bar{V}(\boldsymbol{h}) = \sum_{i=1}^{3} h_i V_i(\boldsymbol{h})$, $\boldsymbol{h} = (h_1, h_2, h_3)$, and the dynamics for the third region are given residually by $\dot{h}_3 = -\dot{h}_1 - \dot{h}_2$.

- A spatial distribution $\boldsymbol{h} \equiv \boldsymbol{h}^*$ is said to be a long-run equilibrium if $f_i = 0$ $(i = 1, 2)$.

- An equilibrium $\boldsymbol{h}^*$ is locally stable if, after a small perturbation due to an exogenous migration, the new spatial distribution reverts back to $\boldsymbol{h}^*$.

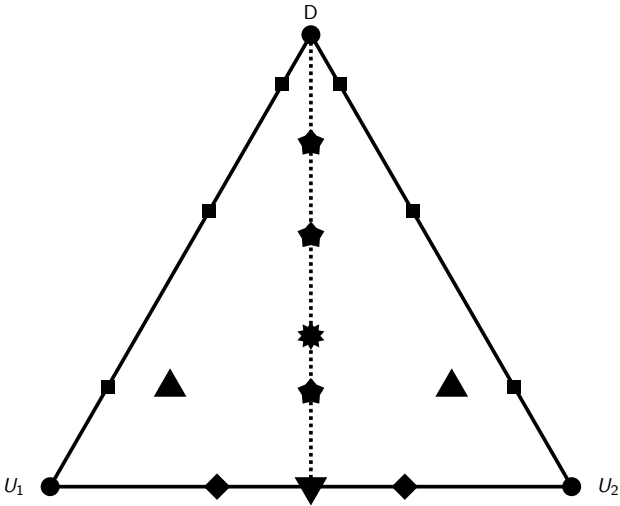
The disentanglement of an economic union

- We assume that all the consequences of leaving the economic union can be summarised as an increase in the bilateral transportation costs between the dissident region and the remaining union regions (τ_D).
- The remaining union regions keep their initial level of transportation costs (τ_U).
- These changes imply that

$$\boldsymbol{\tau} = \begin{pmatrix} 1 & \tau_U & \tau_U \\ \tau_U & 1 & \tau_U \\ \tau_U & \tau_U & 1 \end{pmatrix} \text{ becomes } \boldsymbol{\tau} = \begin{pmatrix} 1 & \tau_D & \tau_D \\ \tau_D & 1 & \tau_U \\ \tau_D & \tau_U & 1 \end{pmatrix}, \ \tau_D > \tau_U.$$

Long-run equilibria

General picture



- Agglomeration
- Boundary dispersion
- Median dispersion
- Total dispersion
- Union dispersion
- Union total dispersion
- Asymmetric equilibria

Agglomeration in the dissident region $\boldsymbol{h} = (1, 0, 0)$

This equilibrium always exists and may be stable.

Union agglomeration $\boldsymbol{h} = (0, 1, 0)$ or $\boldsymbol{h} = (0, 0, 1)$

This equilibrium always exists and may be stable.

Total dispersion $\boldsymbol{h} = (1/3, 1/3, 1/3)$

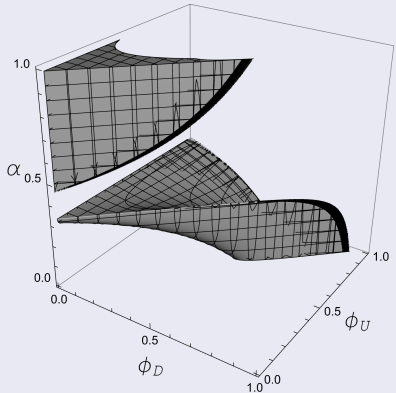
This equilibrium does not exist.

Union dispersion $\boldsymbol{h} = (0, \alpha, 1 - \alpha)$

This equilibrium may exist, but is never stable.

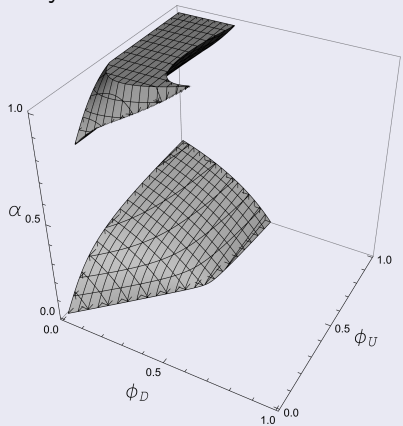
Median dispersion $\boldsymbol{h} = (\alpha, \frac{1-\alpha}{2}, \frac{1-\alpha}{2})$

This equilibrium may exist and may be stable.



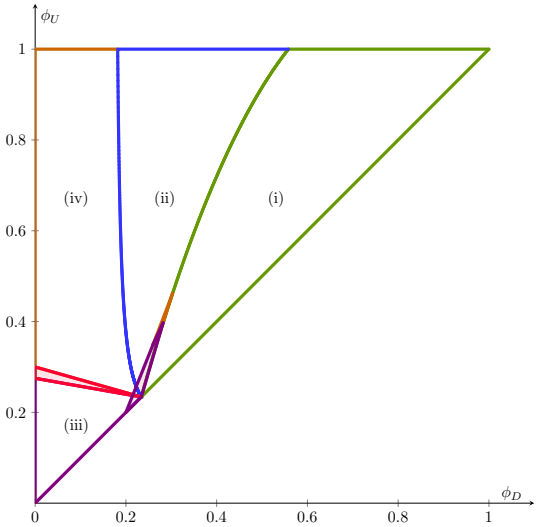
Boundary dispersion $\boldsymbol{h} = (\alpha, 1-\alpha, 0)$ or $\boldsymbol{h} = (\alpha, 0, 1-\alpha)$

This equilibrium may exist and may be stable.



Long-run equilibria

Comparative statics on stable equilibria zones



(i) Any agglomeration

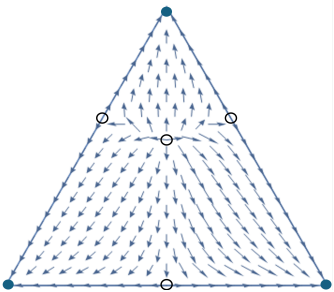
(ii) Union agglomeration

(iii) Median dispersion

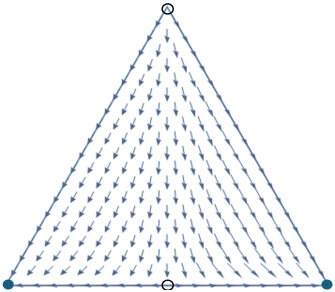
(iv) Boundary dispersion

The dynamics of the disentanglement process

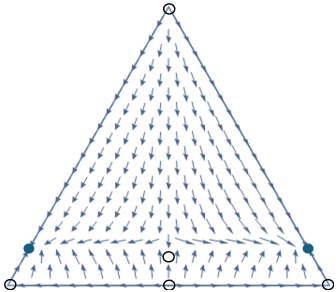
Scenario 1 - High union integration ($\phi_U = 0.8$)



(a) $(\phi_U, \phi_D) = (0.8, 0.7)$



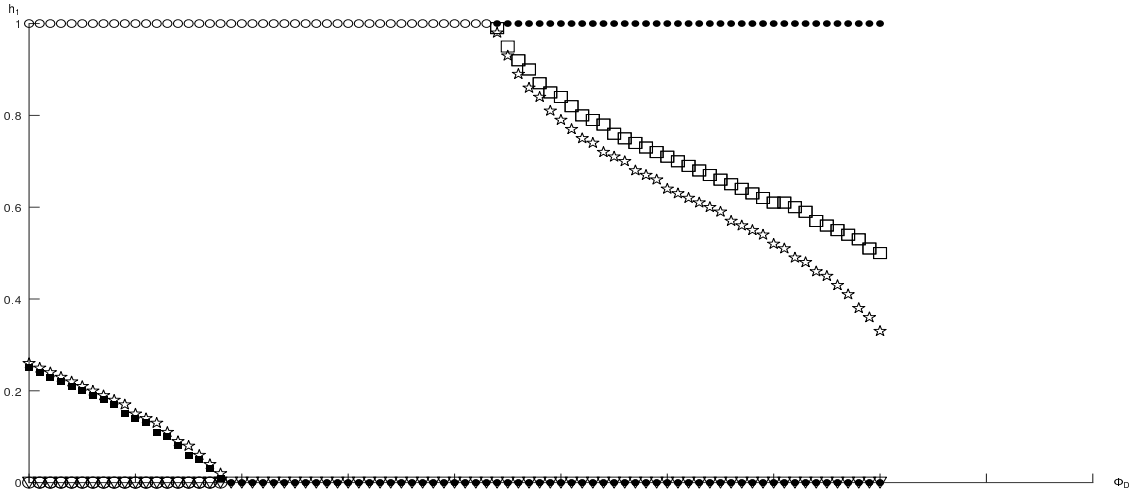
(b) $(\phi_U, \phi_D) = (0.8, 0.4)$



(c) $(\phi_U, \phi_D) = (0.8, 0.1)$

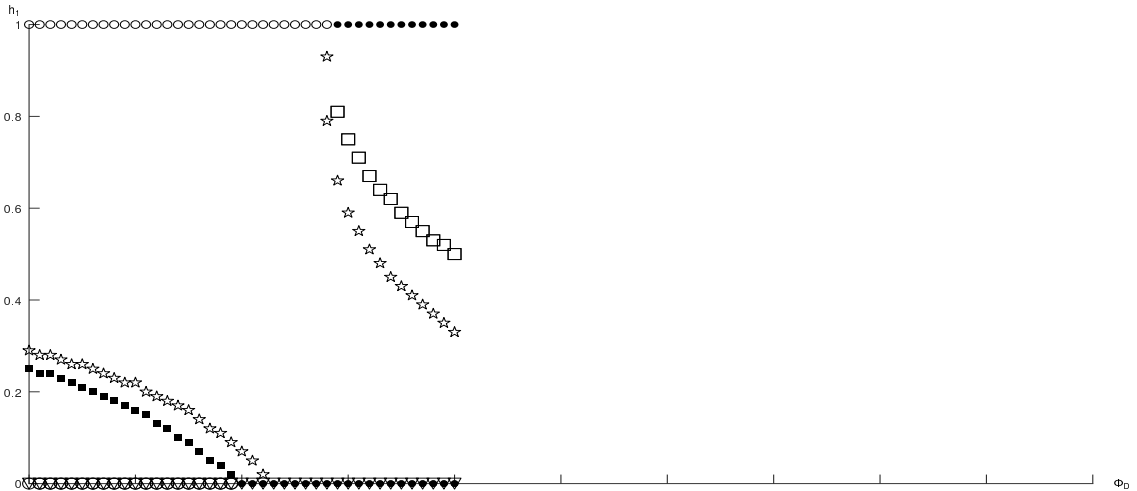
The dynamics of the disentanglement process

Scenario 1 - High union integration ($\phi_U = 0.8$)



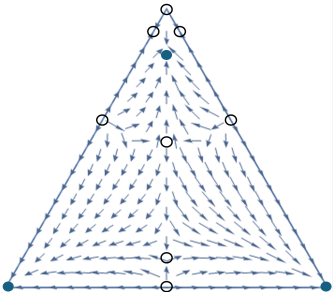
The dynamics of the disentanglement process

Scenario 2 - Intermediate union integration ($\phi_U = 0.4$)

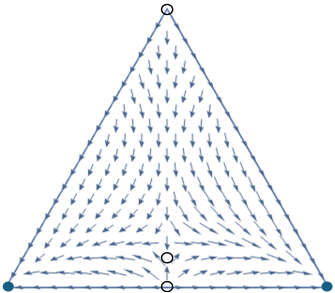


The dynamics of the disentanglement process

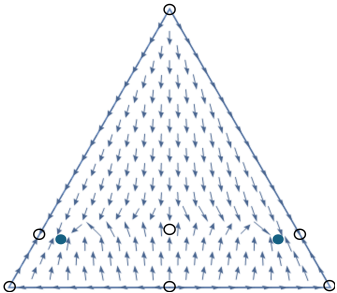
Scenario 3 - Low union integration ($\phi_U = 0.25$)



(a) $(\phi_U, \phi_D) = (0.25, 0.23)$



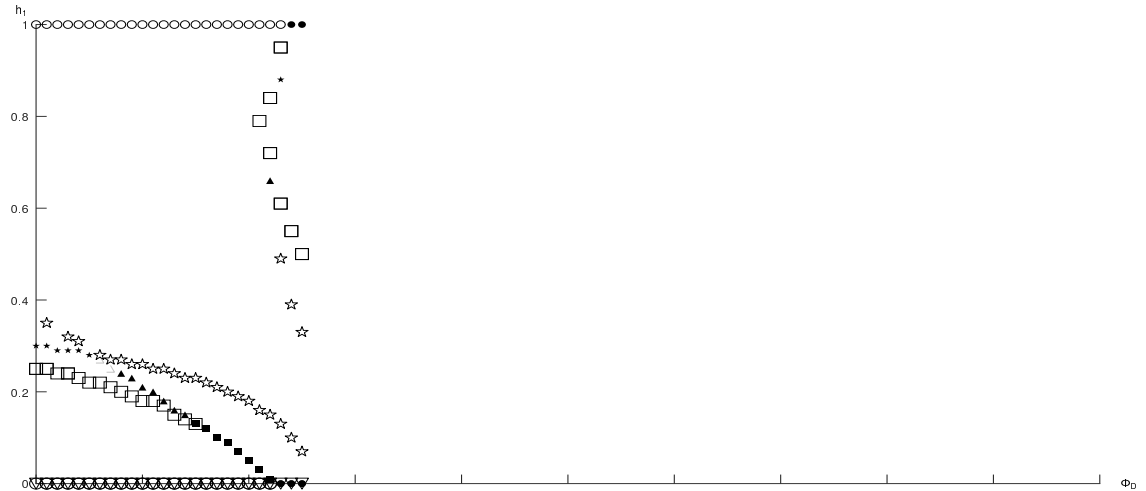
(b) $(\phi_U, \phi_D) = (0.25, 0.22)$



(c) $(\phi_U, \phi_D) = (0.25, 0.112)$

The dynamics of the disentanglement process

Scenario 3 - Low union integration ($\phi_U = 0.25$)



Proposition 14

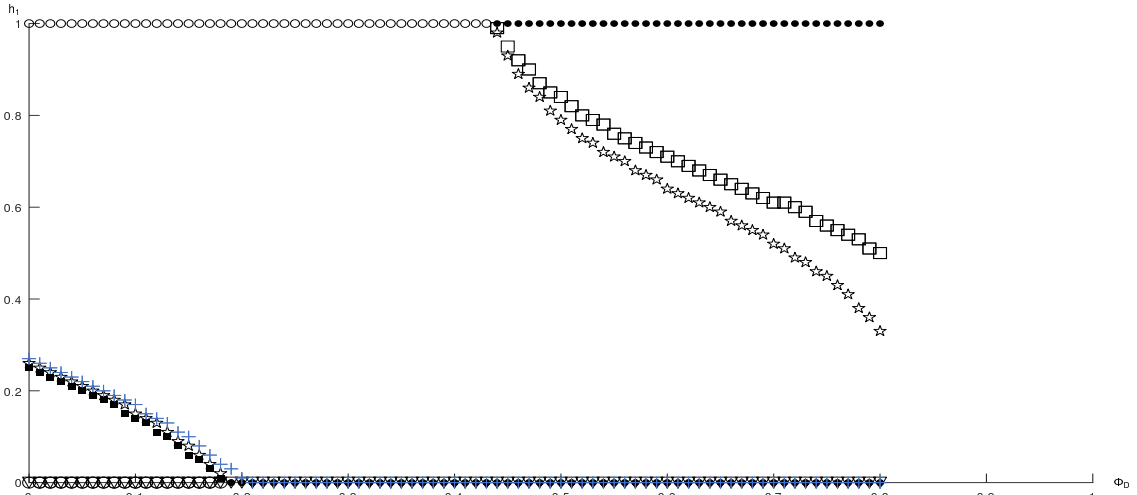
The average indirect utility of entrepreneurs is convex in the spatial distribution of entrepreneurs $\boldsymbol{h}$, attaining a maximum at any agglomeration.

Proposition 15

The average indirect utility of agricultural workers is concave in the spatial distribution of entrepreneurs $\boldsymbol{h}$.

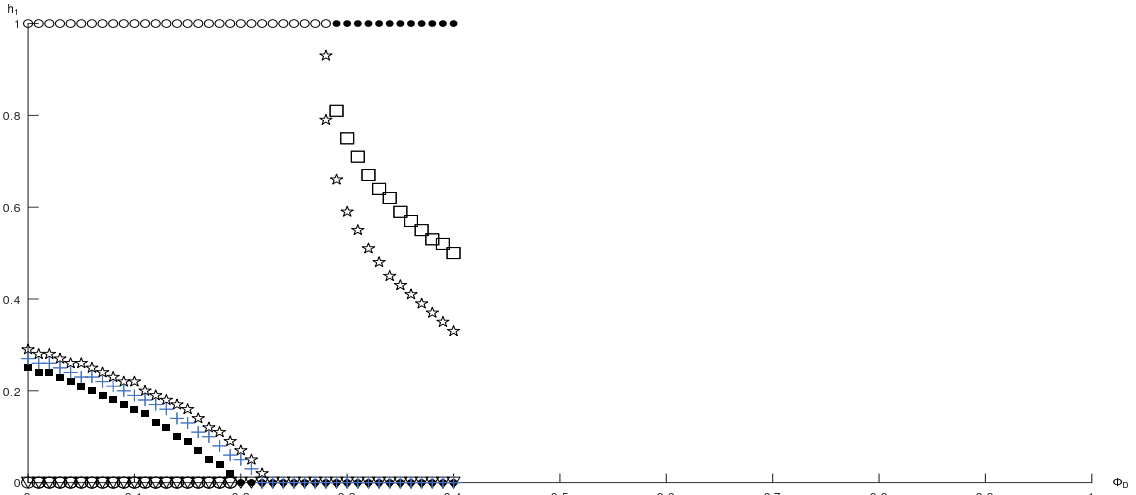
Welfare analysis

Scenario 1 - High union integration ($\phi_U = 0.8$)



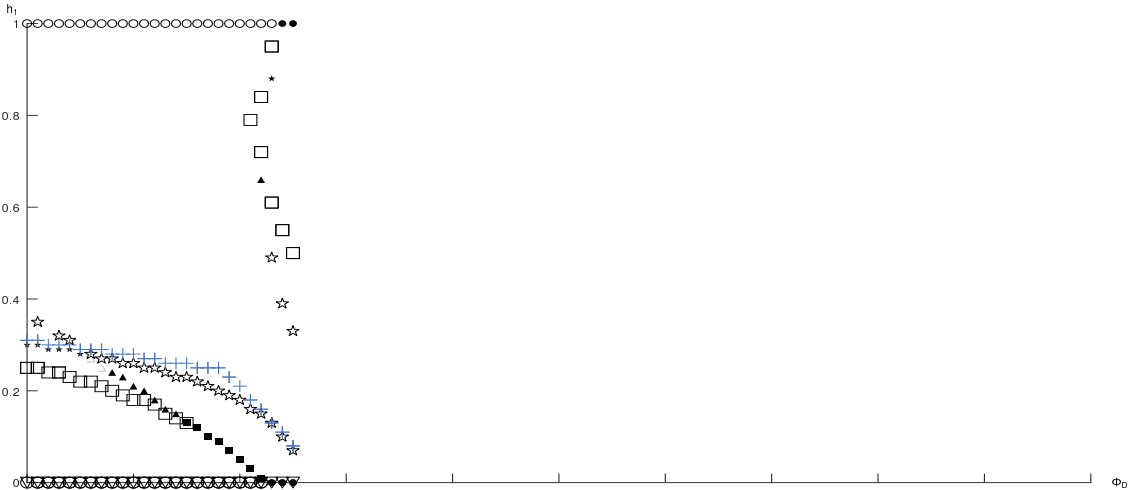
Welfare analysis

Scenario 2 - Intermediate union integration ($\phi_U = 0.4$)



Welfare analysis

Scenario 3 - Low union integration ($\phi_U = 0.25$)



Final remarks

- We find what are the possible spatial distributions after the breakup.
- We find that total dispersion never occurs and that union dispersion is never stable.
- We find that the spatial outcome when an union is highly or intermediately integrated is similar.
- We find that when the repercussions are soft, the dissident region may keep a high share of industry.
- We find that when repercussions are mild, the dissident region becomes depleted of industry.
- We find that when repercussions are hard, the dissident region may have a low share of industry.

Final remarks

- We find that the social optimum occurs for a spatial distribution of entrepreneurs that is always unfavourable towards the dissident region.
- We find that the social optimum occurs closer to the dissident region than the stable spatial distribution.

Even though agglomeration in the UK still exists and may even be stable, as well as other distributions in which the majority of industry is in the UK, for the welfare of the economy to be as high as possible, less than one-third of the industry should be in the UK.

Therefore, we conclude that, from an aggregate point of view, Brexit creates a social bias against living in the UK.

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