by trade costs in knowledge spill-overs processes and in determining the result of the conflict between standard fixed-technology centripetal and centripetal forces.

6 Conclusion

The model we develop in the first part of this paper can be considered as a generalization of the Core-Periphery models by Krugman (1991b) and Krugman and Venables (1995). More precisely, to derive both of them we have to assume that the regional technological levels are the same for the two regions ($a_s = a_n = 1$). Hence, Krugman's model corresponds to the case in which manufacturing firms employ only skilled mobile workers ($I_{mir} = H_r$). Krugman and Venables' model, instead, assume that firms employ only intermediate manufacturing varieties and immobile workers, who correspond to unskilled workers in the present model ($I_{mir} = L_{mir}^{1-\mu} D_{mir}^{\mu} / \left[(1-\mu)^{1-\mu} \mu^{\mu} \right]$).

For given technological levels, we find that full agglomeration of the manufacturing sector in a region is unsustainable for high trade costs because centrifugal forces are stronger than centripetal ones. By contrast, full agglomeration may be an equilibrium for low trade costs. Moreover, the introduction of two types of workers, characterized by different mobility assumptions, allows us to show that the existence of an immobile factor may give rise to a non-monotonic relationship between the sustainability of agglomeration and the levels of trade costs. In fact, we may encounter the $\cap$-shaped relationship found by Venables (1996) when parameter values are such that the wages of unskilled workers are higher in the region in which the agglomeration of the modern sector takes place.[21] When this is so, the existence of an immobile factor may lead to the dispersion of the economic activity for high level of integration because firms find it profitable to produce in the periphery where the wages of unskilled workers are lower than in the core region. However, we show that this happens only if the technological advantage of the core region is not too large, and if the wages of unskilled workers in the core are too high in relation to the technological gap.

For given equal technological levels, we find that the traditional result of a stable symmetric

[21] In particular, this may happen when the share of consumers' expenditure on manufactures μ_c is higher than the threshold value μ_c^*.

equilibrium for high trade costs holds. Moreover, we show that when the technological advantage of a region is very high with respect to the other region, full agglomeration of manufacturing in the leading region is sustainable even for the highest values of trade costs.

When we allow for technological change and potential knowledge spill-overs, we enrich the analysis by considering new forces that may modify the above-mentioned results obtained with fixed-technology centripetal/centrifugal forces. More precisely, when obstacles to interacting, proxied by trade costs, are high, the symmetric equilibrium becomes unstable and centripetal forces induce the agglomeration of the manufacturing sector in the more developed region. Besides, low trade costs may yield either the agglomeration in the more productive region, or the dispersion of the modern sector.

In particular, the symmetric equilibrium can be attained only if the lagging region can complete a catching up process with the leading region. Hence, we show that the symmetric equilibrium is unstable when trade costs are too high, because firms in the lagging region cannot benefit from the potential knowledge spill-overs from the leading region. In this case, firms in the less developed region do not have enough opportunities to interact with firms in the leading region and, therefore, they are unable to assimilate the more productive technologies used by the latter. As a result, the technological gap between the two regions increases, and the manufacturing sector ends up being completely concentrated in the leading region. By contrast, when trade costs are sufficiently low, firms in the lagging region can benefit from knowledge spill-overs and the symmetric equilibrium may be stable if all the centripetal forces are weaker than the centrifugal ones.

Moreover, we find that, for intermediate trade costs values, the symmetric equilibrium can be stable, provided that the initial technological gap between the two regions is not too wide. In fact, when it is very wide, firms in the lagging region are unable to assimilate the potential knowledge spill-overs. When this is so, the agglomeration of the manufacturing sector in the leading region is the only sustainable equilibrium.

To sum up, there is a trade-off in the role played by trade costs in knowledge spill-over processes, and in determining the result of the conflict among the other fixed-technology centripetal and centrifugal forces. The results of this trade-off depend on which of the effects produced by different trade costs levels prevail. Particularly, if trade costs are very high, manufacturing ends up being completely agglomerated in the region that has an initial technological advantage, because firms in the lagging regions are unable to benefit from the interregional potential knowledge spill-overs. Thus, we like to stress that our results reverse the usual conclusion of New Economic Geography models that high trade costs favors economic dispersion by showing that high trade costs favor the agglomeration of firms in the more productive region.

Appendix A. Sustainability of agglomeration of the manufacturing sector in region v.

Agglomeration of the manufacturing sector in region v is an equilibrium if sales of a (potential) deviant firm relocating in region r are less than the level required to break even, that is if:

$$Q_{mir} < Q^*_{mir}$$

Let us consider as given the regional levels of the technology a_r and a_v.

A manufacturing firm has positive (negative) profits if its production is higher (lower) than the amount required to break even, Q^*_{mir}, that is given by

$$Q^*_{mir} = a_r$$

where $r = s, n$.

Let us consider the case in which the manufacturing sector is fully agglomerated in region v and a firm that is a potential deviant in region r. This firm decides to start its production in region r if the demand that it faces by producing in region r is higher than (or equal to) the amount Q^*_{mir} required to break even by producing in this region. The relationship between the two regional break even quantities is:

$$Q^*_{mir} = \frac{a_r}{a_v} Q^*_{miv} \tag{33}$$