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Increasing Returns and International Trade

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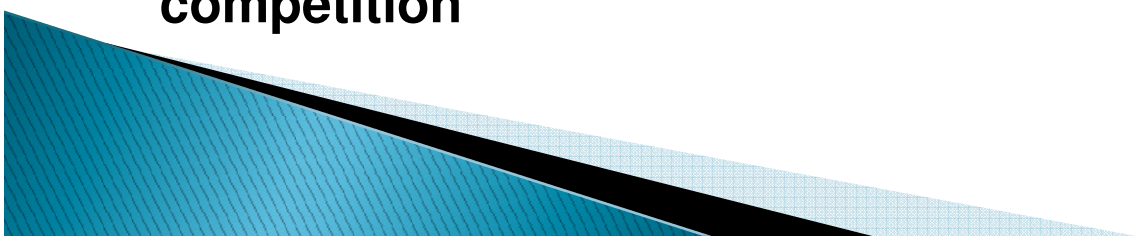
Increasing Returns and International Trade

- **Mid-1960s, trade theory dominated by Heckscher-Ohlin model**
- **Could not account for stylized facts (Dixit, 1993):**
  - **Trade between countries with similar factor endowments**
  - **Two-way trade in similar products – *intra-industry trade* (IIT)**
- **Grubel and Lloyd (1975), in documenting extent of IIT, argued it could be explained by *economies of scale***
- **Ohlin (1933), and others (Graham, 1923; Knight, 1924), had already recognized role for increasing returns in trade models, but posed awkward problem for theorists – inconsistency with perfect competition**



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- **Attempts to incorporate *external economies* into general-equilibrium analysis, by Melvin (1969), and Chipman (1970), *inter alia* – generated a "…bewildering variety of equilibria…" (Krugman, 1995)**

- **In late-1970s, economies of scale and imperfect competition embedded in trade models – (a) Krugman (1979, 1980) and Lancaster (1979) in one-sector models of IIT, (b) Dixit and Norman (1980), Lancaster (1980), and Helpman (1981) integrating traditional trade theory with IIT**

- **Scale economies *internal* to firm, but moderate enough to ensure survival of large number of firms in free-entry equilibrium producing close but not perfect substitutes, i.e., *monopolistic competition***

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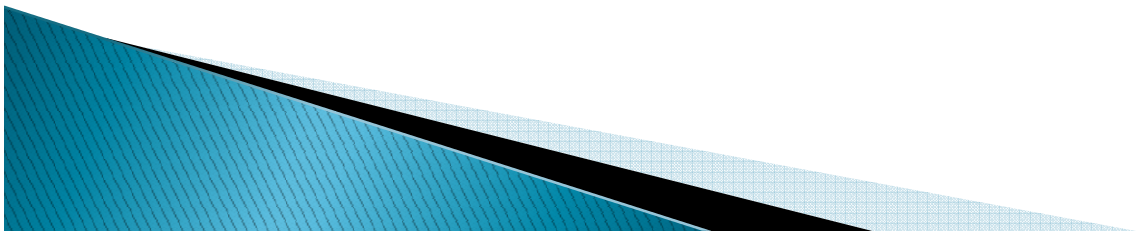
- **Role of differentiated products recognized by Haberler (1937), but attempts to incorporate monopolistic competition into trade theory unsuccessful (Helpman, 1984)**

- **Limitation – absence of rigorous treatment of product differentiation – solved in 1970s through two approaches: (i) Dixit and Stiglitz (1977) *love of variety*, and (ii) Lancaster (1979), *preferred variety* – both generating *aggregate demand* for variety**

- **Krugman drew on (i), Lancaster, and Helpman (ii); how to model preferences essentially unimportant – *either* approach ends with an equilibrium, characterized by firms with monopoly power earning no monopoly profits (Krugman, 1987)**



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- **Krugman's (1979) original model:**
  - **economy with single factor *l*, used to produce *i* = 1,…*n* goods:**

$$l_i = \alpha + \beta_i, \qquad \alpha, \beta > 0$$

  - **all goods enter utility function symmetrically:**

$$U = \sum_{i=1}^{n} v(c_i), \quad v' > 0, \quad v'' < 0$$

  - **workers also consumers, and there is full employment:**

$$x_i = Lc_i, \text{ and, } L = \sum_{i=1}^{n} (\alpha + \beta x_i)$$

  - **have to solve for: p / w, x, and n (dropping subscript i)**
  - **firm's pricing condition implies: $p / w = \beta\varepsilon / (\varepsilon - 1)$, $\varepsilon = -v' / v''c$,**

$d\varepsilon / dc < 0$, giving *PP* in figure 1

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- zero profit condition implies:

$0 = px - (\alpha + \beta x)w$, or $p / w = \beta + \alpha / Lc$ giving *ZZ* in figure 1

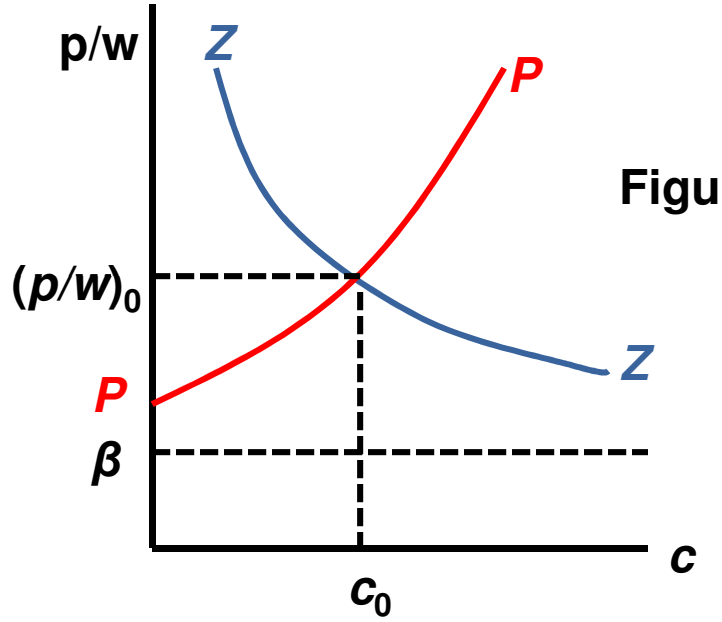

Figure 1

- solving for c, and given $x = Lc$, number of goods in equilibrium is: $n = L / (\alpha + \beta x)$ - number of goods constrained by α

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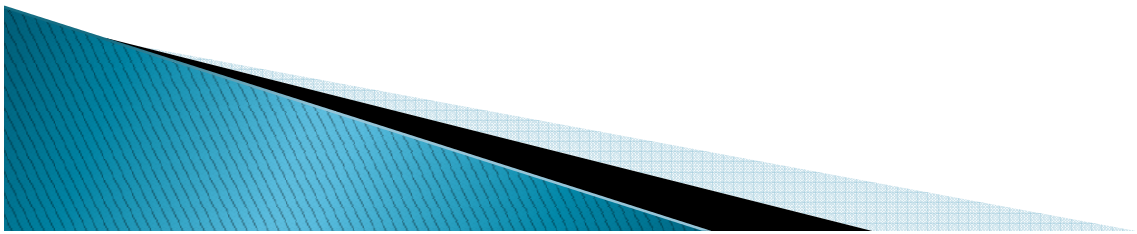
- **Allow for another identical economy – doubling *L*, shifts *ZZ* curve down to left, lowering *p*/*w* and *c*; direction of trade indeterminate, but there is IIT, and gains from trade due to:**

  (i) increase in output *x* of each good: $x = \frac{\alpha}{p/w - \beta}$

  (ii) and increased variety of goods *n*: $n = L/(\alpha + \beta Lc)$

- **result dependent on *PP* sloping up, which depends on elasticity of demand ε rising as *c* falls, i.e., increased variety results in goods becoming closer substitutes**

- **in Krugman (1980), elasticity held constant, gains from trade being increased variety, with no increase in scale of output**



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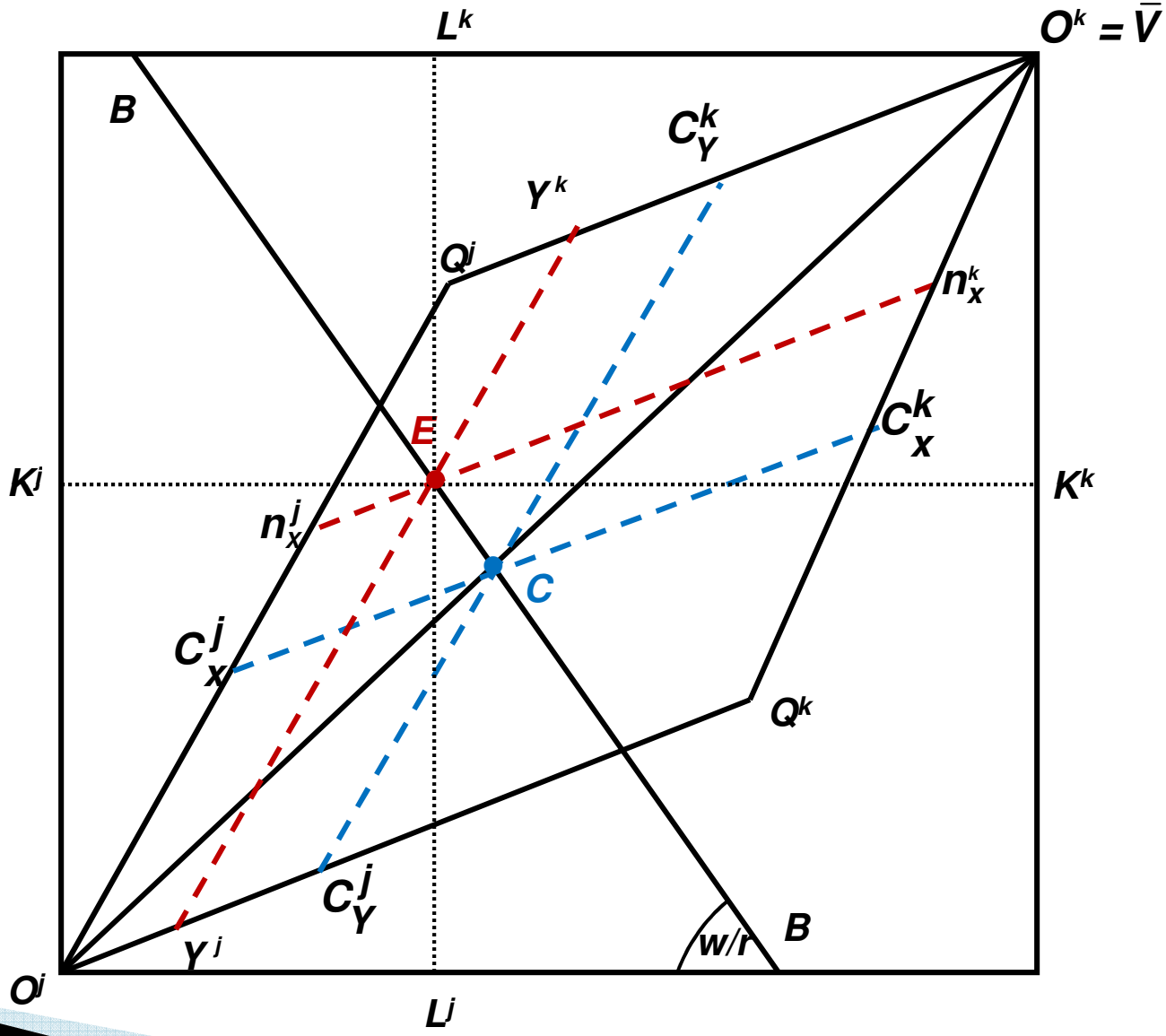
- **Subsequent analysis by Helpman and Krugman (1985), used approach popularized by Dixit and Norman (1980), setting monopolistic competition in context of traditional trade theory**
- **Assume two countries, *j* and *k*, two factors, *K* and *L*, and two industries: one is competitive producing homogeneous good *Y* under constant returns, the other monopolistically competitive producing range of goods *X* = *nx* under increasing returns**
- **Also assume *Y* is labor-intensive, *X* is capital-intensive, and that countries have common knowledge of technologies and identical, homothetic preferences**
- **In figure 2, trade in goods reproduces integrated equilibrium, with both *inter* and *intra*-industry trade**

Figure 2: Trade Equilibrium



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- **Krugman (1979) helped pioneer incorporation of increasing returns and product differentiation into trade models**

  "…Remarkably, the paper achieves all of this in only ten pages, and in a very simple and transparent fashion…" (Prize Committee of the Royal Swedish Academy of Sciences, 2008)

- **Synthesis allowed incorporation into general equilibrium trade model, and extended application to external economies, intermediate goods trade, vertical integration, and multinational firms (Helpman and Krugman, 1985)**

- **Also provided foundations for his subsequent work on increasing returns and geography (Krugman, 1991)**