such that each consumer purchases one of the to goods, thus abstracting aay from aggregate demand e¤ects (which are already ell understood) and focusing on strategic market-share e¤ects

(i) a Nash equilibrium in prices— the "(imperfectly) competitive regime", and (ii) the joint-pro…t maximizing cartel— the "(fully) collusive regime" welfare point of view, prices cancel out because they are a transfer. Only market allocations matter, and what is important for these are relative prices (or relative cost-adjusted prices). Since markets and all equilibria are symmetric, we can consider welfare effects in a single market. In each market, the "home" firm has a cost advantage over the "away" firm because the home firm does not incur welfare by restricting trade— has not been made.[6] Second, as in the standard Hotelling framework, studies the division of regional markets by …rms in the Brazilian cement industry. By quantifying

In the trade literature, Brander and Krugman (1983) show that exogenously moving from autarky (there is, by definition, no cross-hauling) to trade competition in a homogeneous-good Cournot oligopoly where aggregate demand slopes downward— and with free entry— is welfare-enhancing:

Consumers make discrete choices, purchasing one unit or none. Let x 2 $[0; 1]$— the consumer's

(now adding market subscripts, and where the superscript C denotes the competitive equilibrium). In equilibrium, the location of the marginal consumer, and thus the quantity share of home …rm A,

$$-$$

Notice that A1 implies that x_1^C

(a condition that, from the de…nition of $\tilde{x}$, is equivalent to $U_B(p_B; \tilde{x}(p)) = 0$), whicT from (1) can be rewritten as $2V \quad p_A \quad p_B = 0$. Using this locus of prices, the perfect cartel's problem

$$\max_{p_A; p_B} (p_A \quad c) s_A(p) + (p$$

alternative regimes, i.e. as t ! 0, we have that x_3

3.2 First-best social outcomes

The immediate question then is how distortionary are the market-based behavioral regimes derived above?We now compute the set of …rst-best outcomes, where social welfare is maximal, and compare them to the competitive and collusive outcomes. As we explain, what characterizes a …rst-the trade cost t, in contrast to the market-based regimes where price discrimination was substantial welfare being optimal, would set prices such that the marginal consumer's surplus is fully extracted, $U_A(p_A; \tilde{x}_1^{FB}) = 0$, that is

$$p_{1A}^{FB;pro\ \ b} = V \quad \tilde{x}_1^{FB} = V \quad \frac{1}{2}\min(t + \ ; 2\ ); \quad p_{1B}^{FB;pro\ \ b} = p_{1A}^{FB;pro\ \ b} + t = V + t \quad \frac{1}{2}\min(t + \ ; 2$$

for CS^C earlier, we obtain

$$CS^{FB;pro\ c} \quad CS^{C} = \left\{ \quad \frac{1}{9} \right.$$

For a market-based regime with either price competition or full collusion, the following proposition describes the symmetric tax and subsidy policy that yields the welfare-optimal market allocation.

Proposition 5 An appropriate tax and subsidy policy can be used to induce the market-based and (iii) $\tilde{x}_1^C \quad {}^{+\,!\,=\,-\,t}_{\qquad\;\;!} \; \tilde{x}_1^{JM}$, with the latter characterizing an "intermediate" (suboptimal) level of intervention.

Finally, notice that as a potentially set

3.5 The e¤ects of home bias

Very often, consumers in a market favor locally-sourced products over competing imports. Part of

4 Concluding remarks

In the context of trade where aggregate demand e¤ects are small, we have provided a m2del—employing only standard ingredients— rere the following unconventional and clear-cut combination of results obtains: (i) (perfect) collusion reduces, though does not eliminate, trade relative to competition, leading to a cartel allocation consistent with the "home-market principle"; (ii) this collusive reduction in trade (and thus reduction in the heterogeneity of consumption) enhances total welfare; (iii) the welfare gain from collusion occurs even when the trade cost is low (with this welfare gain increasing in the trade cost and decreasing in the degree of product di¤erentiation); (iv) the cartel's reduction in trade can even enhance consumer welfare relative to the competitive

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the entire home market but less than full share of the foreign market, or where the deviant …rm ends up capturing both markets entirely. In what follows, we …rst analyze optimal deviation (conditional on a …rm deviating from the equilibrium path). Since marginal cost is ‡at in output, defection can be analyzed separately for the home market and the away market. Subsequently, we study the perfect cartel's incentive constraint in each deviation case. Without loss of generality, our deviant …rm is …rm A.

A.1 Optimal deviation in the home market

In market 1, if …rm B abides by the agreement and sets a price of p^{JM}

at

Second scenario: Firm A captures the entire market in the defection period. If instead $4V - 4c - 5t - 14 \quad 0$, then deviant …rm A sets price p^D_{2A}

Case I: Both ...rms command positive market shares in each of the two markets: 4V 4c + t 14 < 0 The deviant ...rm's defection-period pro...t across both markets is then the sum of (9) and (11):

$$ {}^{D}_{\text{Case I}} = \frac{(4V \quad 4c + t + 2\ )^{2} + (4V \quad 4c \quad 5t + 2\ )^{2}}{128} \tag{16}$$

So, making use of eqs. (13)-(16), the critical discount factor above which the fully collusive outcome can be sustained in this case is given by:

$$ j_{\text{Case I}} = 9\frac{16\,(V \quad c)\,(V \quad c \quad t) \quad 48\ \ (V \quad c) + 12\ \ (2t + 3\ \ ) + 5t^{2}}{144\,(V \quad c)\,(V \quad c \quad t + \ \ ) \quad 36\ \ (2t + 15\ \ ) + 53t^{2}} $$

Now consider the competitive regime. In the presence of a tax and a subsidy, prices in the competitive equilibrium solve the modi…ed system (cf. Section 2.1)

$$\begin{cases} \max_{p_A} (p_A \quad c + !)\, s_A(p) \\ \max_{p_B} (p_B \quad c \quad t \quad)\, s_B(p) \end{cases}$$

yielding prices and pro…ts (again, for brevity, we write the proof for an interior solution, t < , otherwise the corner solution of Sioction 3.2 applies)

$p^C_{1A}($

where, as expected, $p^{C}_{1B}(\ ;\ !\ )$

on foreign sales, as stated in Sections 2.1 (competitive regime) and 2.2 (collusive regime). For brevity, we simply state the sum of consumer surplus and producer surplus in each regime: W^C = 36V 36c 18t + 5t^2 9 ^{2} =(36) and W^{JM} = 16V 16c 8t + 3t^2 4 ^{2} =(16).

We now calculate welfare di¤erences across regimes, …rst considering the parameter subspace for which there is full coverage under autarky (i.e. V c 2). We compute 16 W^{AUTK} W^{JM} = 3t^2 + 8t 4 ^{2} which, being concave in t and having roots t = $\frac{2}{3}$;2 , is strictly positive over the interval $\frac{2}{3}$ < t < 2 : hence (conditional on full coverage, an6Td[,). Wet respectivexamp28(el)1es).

Figure 2: The extent of cross-hauling across the different trade regimes, within and beyond the restricted space of parameters (A1). Market 1's import share $1 - \tilde{x}_1$ (left axis) and share of home good $\tilde{x}_1$ (right axis, inverted scale) against trade cost t.