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CHAPTER 14

**The Trade-Disruption Hypothesis and the
Liberal Economic Theory of Peace**

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The systematic analysis of the relationship between economic interdependence and international conflict emerged in the mid-1990s as a thriving research program, one that involved both proponents and critics of the long-standing liberal belief that interdependence promotes peace. While most of the literature has focused on the impact of trade on conflict, our finding that war did not systematically and significantly reduce trade between seven minor power dyads over the last century (Barbieri and Levy, 1999) helped to trigger a secondary debate on the impact of war on trade. Anderton and Carter (2001a) extended the analysis of the impact of war on trade to major power as well as minor power dyads, and their findings raised questions about the generality of our findings. A debate ensued (Barbieri and Levy, 2001; Anderton and Carter, 2001b). This debate has enormous implications for the trade-promotes-peace hypothesis and liberal international theory more generally. The assumption that war reduces trade is one of the central causal mechanisms underlying the liberal proposition that trade promotes peace.¹

In this chapter we present our original study of the impact of war on trade (Barbieri and Levy, 1999), summarize the Anderton and Carter (2001a) study, and note some of the ways in which it differs from our own analysis. Anderton and Carter (2001a) are more interested in extending our analysis to major power dyads and determining the extent to which our empirical findings are generalizable than in questioning the validity of our findings in our particular sample of cases. We have challenged the strength of their findings elsewhere (Barbieri and Levy, 2001), and rather than reproducing that entire critique here we simply summarize some of the major points of contention.

The Theoretical and Empirical Debate

In recent years there has been a surge of interest in the relationship between trade and militarized international conflict, as scholars have begun to reformulate long-standing arguments and to test these theoretical propositions systematically against the empirical evidence. The primary focus has been on the question of whether trade promotes peace, and scholars have generally framed the debate in terms of the 'paradigm wars' between liberalism and realism.

Liberals advance a number of interrelated theoretical arguments in support of the proposition that trade promotes peace. The most compelling of these is that trade generates economic benefits for both parties, and that the anticipation that conflict will disrupt trade and lead to a loss or reduction of the gains from trade deters political leaders from conflict against key trading partners (Polachek, 1980, 1992; Oneal and Russett, 1997; Doyle, 1997).² Realists and others argue either that trade has a negligible impact on conflict (Buzan, 1984; Levy, 1989a: 260–262, 2003; Ripsman and Blanchard, 1996/97), or that trade—and particularly asymmetric trade—actually increases conflict between trading partners (Barbieri, 1995, 1996a, 2002).³ Scholars on both sides of this debate have recently begun to generate empirical evidence to bolster their theoretical arguments.⁴

Although contemporary liberal and realist theories disagree about the effects of trade on conflict, they appear to agree on the effects of conflict on trade. Both imply that trade and other forms of economic interchange between states will cease or be drastically reduced once states are engaged in serious conflicts with each other. The liberal hypothesis that trade deters conflict is based on the premise that conflict will substantially reduce trade or adversely affect the terms of trade. Realist theories imply that trade, particularly in strategic goods, will terminate between adversaries because of relative gains concerns (Waltz, 1979; Grieco, 1990; Huntington, 1993). Fearing that its adversary will reap relative gains from the continuation of trade and exploit those gains to increase its relative military power and potential, at least one state will perceive an incentive to cease trade.⁵ If relative gains concerns exist during peacetime, we expect them to be even greater during wartime. Similarly, once states prove themselves to be adversaries in war, there should be a heightened sensitivity to concerns about security externalities and thus a reduction or elimination of trade between wartime enemies.

Contrary to both liberal and realist theories of interdependence and war, however, there are numerous historical cases of trading with the enemy during wartime, including trade in strategic goods that directly affect the ability of a state to prosecute the war. This is quite evident from numerous historical accounts (Giltner, 1997; Levy and Barbieri, 2001).⁶ For example, the Baltic trade was so essential to the economy of the Netherlands in their Eighty Years' War with Spain (1565–1648) that the Dutch served as carriers of naval stores for the Spanish. In this way the Dutch earned the monies to pay the forces that protected Dutch frontiers against Spanish attack, while Spain secured the stores that

helped maintain its fleets engaged in the protection of Spanish commerce against Dutch attacks (Howard, 1976: 44). Or consider the Seven Years' War of the mid-eighteenth century, in which British insurance companies continued to insure French naval and commercial ships and to pay enormous sums to replace ships that were actively being searched and destroyed by British warships (Pares, 1963). Trading with the enemy was also widespread during the War of 1812 and the Crimean War (Levy, 1998), and this phenomenon has not ceased in this century.⁷

Trading with the enemy—whether directly or indirectly through neutral states—is an interesting phenomenon in itself and one that has important implications for contemporary theories about the relationship between economic interdependence and peace. The liberal hypothesis that trade deters conflict rests on the assumption that conflict reduces trade and, hence, the welfare gains from trade, so that systematic evidence that states trade with the enemy during wartime would undercut this central causal mechanism of the liberal proposition. Such evidence would also undercut the strong implication of realist theory that relative gains concerns will lead one or both adversaries to terminate trade in order to deny the other the ability to convert relative gains into usable military power.

Thus both liberal and realist theories generate the strong hypothesis that the outbreak of war substantially reduces levels of trade, at least while the war is underway. Whether trade will remain depressed after the termination of war, or whether it will quickly return to prewar levels, is less well specified. Liberal theories imply that the loss of the gains from trade refers not only to the losses suffered during the war itself but also to the adverse impact of war on the future trading relationship, at least for a while.⁸ It is conceivable, though less likely, that in some circumstances political leaders are concerned only with the loss of trade during the war and expect a rapid recovery after the war. Clearly, the deterrent effects of the anticipated loss of trade will be lower if leaders expect that trade will resume immediately after the termination of war. Thus we conclude that liberal theories predict both a reduction of trade during war and only a delayed and gradual recovery of trade after war under most conditions, but that the intrawar effect is on average stronger than the postwar effect.

Similarly, realists do not clearly specify what happens to trade after a war is over. Under some conditions war resolves outstanding disputes and creates conditions for profitable trade soon after the termination of war.⁹ Under other conditions mutual threat perceptions remain high after the end of war because of fears that the adversary may use gains from trade to enhance its military power and potential for leverage in future conflicts, perhaps motivated by the loser's incentives to recover its losses.¹⁰ Our reading indicates that the second set of conditions is more common, with the prediction of a slow recovery of trade after war being weaker than the prediction of the reduction of trade during war.

Many of the same arguments about the impact of war on trade should apply to militarized conflict short of war, largely because of fears of escalation to war. Because of uncertainties about escalation, however, the causal effects should be

somewhat weaker, whether motivated by liberal concerns of the loss of welfare gains from trade or by realist concerns for relative gains. We would hypothesize that the impact of war on trade should be greater than the impact of militarized disputes on trade.¹¹ Consequently, trading with the enemy in wartime is more of an anomaly for contemporary liberal or realist theories of interdependence and war than is trading with the adversary during a period of militarized disputes or rivalry, and for this reason our empirical study focuses on the impact of war rather than of more generalized forms of conflict.

Our argument, then, is that the impact of conflict (and particularly war) on trade has enormous implications for the impact of trade on conflict in contemporary liberal and realist models of the relationship between economic interdependence and conflict. We are careful to distinguish, however, between liberal and realist paradigms of international politics and contemporary scholars' *applications* of those paradigms to the question of the relationship between economic interdependence and conflict. Our argument is not that liberal and realist paradigms are incapable of explaining the trading-with-the-enemy phenomenon, but rather that liberal and realist theories of interdependence and conflict, as they are now formulated in the literature, do not adequately deal with this phenomenon.

As we argue later, liberal theory can help explain this phenomenon by incorporating the political power and interests of key societal groups, and realism can do so by incorporating third parties into its conceptualization of relative gains. Applications of these paradigms to the interdependence and conflict debates, however, are framed much more narrowly. Both liberals and realists focus primarily on the dyadic level, ignore the role of domestic actors and third parties, and are consequently unable to account for the important phenomenon of trading with the enemy.¹² Moreover, because the impact of conflict on trade is central to theories of the impact of trade on conflict, current liberal and realist theories fail to provide a satisfactory explanation of the consequences of economic interdependence for international conflict. By demonstrating that war—the most serious manifestation of conflict—does not systematically reduce levels of trade between states, we hope to emphasize the need to construct a more complete and more accurate theory of the relationship between economic interdependence and militarized interstate conflict.

Empirical Literature on Conflict and Trade

In spite of its theoretical importance, scholars have devoted remarkably little systematic attention to either the phenomenon of trading with the enemy or to the broader question of the impact of war on trade. Historians have examined particular instances of this phenomenon (Giltner, 1997), and recent theoretical work on the security externalities of trade (Gowa, 1994; Morrow, 1997; Werner, 1997) have important implications for this question,¹³ but there are few system-

atic empirical studies of the frequency and importance of trade with the enemy or the conditions under which this is most likely to occur.¹⁴

Similarly, there has been relatively little systematic research on the broader question of the impact of war on trade.¹⁵ One of the few studies to focus on war per se is Mansfield (1994), whose systemic-level study shows that less trade is conducted during periods in which major powers are involved in wars against each other or against other states.¹⁶ Others focus on the impact of cooperative and conflictual relationships defined more broadly. Pollins (1989a, b) constructs a model of bilateral trade flows and finds that for the 1960–75 period cooperative political relations between states increases trade between them. As noted, Gowa (1994) finds that trade is higher among allies than among adversaries, which she interprets in terms of the security externalities of trade.

Most scholars who have empirically examined the impact of conflict on trade and the impact of trade on conflict concede that the true nature of the relationship between these two variables is probably reciprocal and that current models fail to capture the relative importance of these causal paths. Polachek (1980: 63), for example, notes in one of his early studies that it is impossible to determine 'whether trade diminishes conflict, or whether in fact the reverse is true, and it is really conflict that reduces trade'.

Concerns that unidirectional models of the conflict–trade relationship are misspecified have led scholars to apply Granger causality analysis (Freeman, 1983) in an attempt to disentangle the effects of conflict on trade and the effect of trade on conflict. Gasiorowski and Polachek (1982) examine the USA–Warsaw Pact relationship from 1967 to 1978, use the COPDAB data to measure conflict and cooperation, and conclude that Granger causality for short lag periods runs overwhelmingly from trade to conflict and not from conflict to trade. If true, this is a puzzling finding because it simultaneously supports the liberal prediction that trade depresses conflict while undercutting the central causal mechanism of the liberal hypothesis—the anticipation that conflict reduces trade and consequently the welfare gains from trade will deter states from conflictual behavior.

Reuveny and Kang (1996a) criticize the use of pooled time-series analysis in Gasiorowski and Polachek (1982) and other studies, on the grounds that this technique might mask dyad-specific effects. Instead, they examine the trade–conflict relationship for sixteen individual dyads from 1960 to the early 1990s, combining the COPDAB and WEIS events data sets. Reuveny and Kang (1996a) find that although the causal relationship between conflict/cooperation and trade is dyad-dependent, it is largely reciprocal. In a subsequent study Reuveny and Kang (1998) disaggregate trade by commodity group, and they find that Granger causality from conflict to trade is more pronounced in 'strategic goods' than in other goods, though they acknowledge the ambiguity of the strategic goods concept.

They also find that patterns of causality are generally not affected by the presence of a political rivalry, though in the U.S.–USSR and U.S.–China dyads bilateral trade in some goods increases as political relations improve.

Recent dyadic-level work on the impact of conflict on trade has moved the debate forward and has contributed to larger debates regarding the relationship between economic interdependence and conflict. The fact that these studies have been limited to three decades of the Cold War period, and thus to a relatively unique set of international and domestic conditions, significantly reduces our confidence that the results of these studies can be generalized to other international systems—either those of the past or those that will emerge in the future. Our more general theoretical concerns lead us to focus on a more extended temporal domain and to construct a research design consistent with that objective.

Our aims are both descriptive and explanatory. We want to describe the phenomenon of trade between adversaries and to explain why states continue to trade with their enemies both during and immediately after wars. We focus on wars rather than a broader category of conflictual events because it is for war that the hypothesized causal mechanisms should be the strongest and the trading with the enemy phenomenon the most anomalous for contemporary liberal and realist theories of interdependence and war.

Research Design

We have argued that contemporary liberal and realist theories of economic interdependence and conflict strongly imply that conflict between trading partners will significantly reduce the level of trade between them, particularly after the outbreak of war. There is some expectation that in the period after war trade will remain depressed and only slowly recover from prewar levels, and that in the period leading up to war trade will begin to decline. Declines in trade both before and after war, however, should be weaker than declines during war.

We investigate the extent to which war disrupts trading relationships using interrupted time series analyses (Lewis-Beck, 1979; Lewis-Beck and Alford, 1980).¹⁷ This technique permits us to examine the level and trend in trade conducted before and following the outbreak of war. If war has a significant effect on trading relationships, we would expect to witness a decline in trade between adversaries that engage in war. Interrupted time-series analysis also permits us to examine both the long- and short-term impact of war. In addition, it permits us to assess whether or not the anticipation of war leads to a reduction in trade.

Testing hypotheses about the impact of war on trade poses a number of formidable methodological problems. One relates to the fact that many states do not provide complete reports of their trading activities during periods surrounding wars. There is a failure to report trade with allies as well as trade with adversaries, and consequently we cannot assume that the absence of trade reports implies the absence of trade. This is particularly true during World War I and World War II, where trade reports are incomplete but where there is ample evidence from secondary historical accounts that some trade continued between belligerents in these wars (Higham, 1983; Aarons and Loftus, 1994). In addition, states may have political and economic motivations for misreporting trade

flow values, during both wartime and peacetime. We expect that the problem of misreporting would be greater during wartime, since states may wish to conceal trade ties with adversaries. If legal restrictions to trade are imposed, illegal activities will also be excluded from official statistics. Thus, the value of trade may be underrepresented in official reports. Thus, data limitations posed by inaccurate and incomplete information are difficult to overcome, and it is often hard to determine whether war seriously disrupts trade flows or simply the reporting of those flows.

In part, we address the problem of inaccurate reporting by one state by relying on the information provided by both states in a dyad. To do this, we rely on the import records for each side of the dyad. If one state is misrepresenting their trade values, our reliance on both states' reports provides a more balanced picture of the relationship.¹⁸ Our measure of dyadic trade, therefore, is defined as the sum of Imports_{ij} plus Imports_{ji}, where Imports_{ij} is the flow from State *j* to State *i* and Imports_{ji} is the flow from *i* to *j*, reported in USD millions. Trade data were derived from an extended and revised version of a trade database constructed by Barbieri (1995).¹⁹ Data from the Correlates of War Project are used to identify the date of a state's participation in a given war (Small and Singer, 1982).²⁰

The lack of available trade data, both for periods during war and for earlier historical eras, restricts the number of dyads that we can analyze. Since time series analysis requires that we have a continuous series of dyadic trade reports, both our spatial and temporal domains were restricted.²¹ We began our investigation by examining the trade patterns for all dyads that experience a war at some time during the period 1870–1992, which corresponds to the availability of our trade data. We selected for our analysis those cases for which we had data available for at least ten years before and ten years after the outbreak of war.²² The temporal domains for our time series range from 17 years to 122 years.

In most cases, the dyad analyzed has a much longer history of engaging in trade than our analysis portrays. When there were interruptions in the time series for data reports, we isolated the analysis to the years immediately before and after the war. In addition, we focus our attention on the impact of one war, even when dyads experience more than one war in their history. Dyads experiencing multiple wars in a short period of time proved difficult to analyze, since it was not easy to distinguish the effect of each war. For example, in the case of China and Japan, five wars occurred in the 1870–1992 period and several were so temporally proximate that it was impossible to distinguish the postwar trade recovery and the prewar trade trend.

From our selection process, we are left with only seven dyads: Argentina–UK, UK–China, Cyprus–Turkey, Greece–Turkey, Uganda–Tanzania, UK–Egypt, and USA–China. We recognize that our limited number of cases restricts our ability to generalize beyond our findings to other cases. The extent of the bias is hard to estimate, however, because it is unclear whether there is any systematic relationship between the availability of trade data surrounding a given war and the way in which the war affected the trading relationship.

One thing that is clear is that each of the wars in our sample is relatively short in duration, with all but one (Uganda–Tanzania) lasting less than a year. Although this is troubling in the sense that we might expect that longer wars have a greater impact on the reduction of bilateral trade between belligerents, we should note that short interstate wars are the norm rather than the exception in international politics.²³ Moreover, by restricting our analysis to short wars we effectively control for the effect of a change in GNP on bilateral trade because long wars are much more likely than short wars to have a significant effect on national economies. This enables us to isolate the direct impact of war on trade, which is the primary testable implication of liberal and realist theories of interdependence and war, as distinct from the impact of GNP on trade.²⁴

We should also note that because of incomplete data our sample includes no cases of great power (major–major) war. We know from historical accounts of World War II and other cases (as mentioned earlier) that trading with the enemy occurs during great power wars (Levy and Barbieri 2001), but our analysis in this study will not formally permit us to generalize about the impact of great power war on bilateral trade, which is unfortunate.

Although our research design will not allow us to make inferences about how frequently or to what extent trade between wartime enemies occurs in the universe of all wars, it will allow us to demonstrate that this phenomenon occurs frequently enough to constitute a potential problem for contemporary liberal and realist theories of trade and conflict.

Let us return to the question of the proper measurement of trade in commercial liberal theory before we move on to the next section. Whereas we measure trade in terms of its value (see also Barbieri, 1995, 2003b), Anderton and Carter (2001a) argue that liberals emphasize trade volume rather than trade value in assessing the importance of trade. They attempt to measure trade volume by using the reporting state's consumer price index (CPI) to adjust trade values. Liberal political or trade theory, however, does not necessarily suggest that trade volume is more important than the value of trade ties. Presumably, a state that attaches greater value to small quantities of a good might be less willing to cut ties, compared to a country that conducts large quantities of trade in low value goods. In fact, one might expect that higher values, rather than higher quantities of trade, will have greater implications for the cost of forfeiting trade, during peace and wartime.

Anderton and Carter (2001a) make a valid point in questioning our use of unweighted price figures, and their analysis raises concerns for both of our studies. A better measure for both studies would permit us to incorporate both the quantity and price of goods traded. Yet, we argued that trade volume most likely declines during war, but the value of that trade increases, since prices on the limited goods traded would be higher than in peacetime. If anything, Anderton and Carter's comments about volume versus value simply highlights the need to incorporate information about quantity, price, alternative suppliers, and the actual commodities traded. Unfortunately, Anderton and Carter's solution of employing the CPI index of the reporting country to adjust trade values for infla-

tionary trends does not solve the problem. It is not clear that the reporting state's CPI is applicable to its trade partner or that the bundle of goods used to calculate the CPI corresponds to the price changes for goods traded externally. Finally, we rely on information from each state in a dyad, rather than relying on only one state, as Anderton and Carter do, since this enables us to reduce the bias that results when one state tends to over or underreport the value of trade. In the end, Anderton and Carter's measure, like ours, ends up capturing trade value or at least a rough approximation of the value of trade conducted during wartime.²⁵

Statistical Techniques

For each dyad, we estimate the following equation (Lewis-Beck, 1979: 1132; Lewis-Beck and Alford, 1980: 747):²⁶

$$\text{Trade}_t = \beta_0 + \beta_1 \text{Trend}_t + \beta_2 \text{War level}_t + \beta_3 \text{War rate}_t + \epsilon_t$$

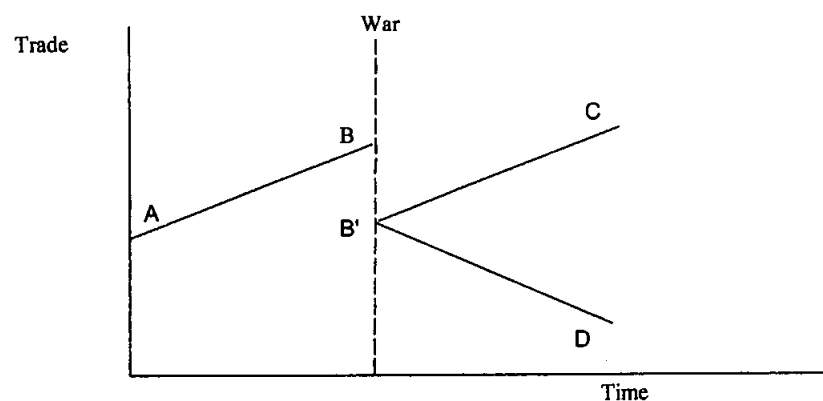
where Trade_t = the annual observation of dyadic trade flows in millions of USD, Trend_t is a counter for each year of the series; war level_t is a dichotomous variable that equals 0 for each observation before the outbreak of war and 1 for each year after the outbreak of war; and War rate_t = a counter of years scored 0 before the outbreak of war and 1, 2, 3...once the war occurs. The parameters β_0 and β_1 allow us to estimate the level and slope of dyadic trade before the war, respectively; β_2 estimates the change in the level of trade after the war; and β_3 estimates the change in the slope after the war. In addition, we include an AR (1) adjustment parameter to address the problem of autocorrelation.²⁷

Figure 14.1 illustrates the manner in which we can utilize interrupted time series techniques to assess the impact of war on trade.²⁸ Imagine two states whose trade increases each year, yielding the positive sloping line AB. If war has a substantial disruptive impact on trade, we would see a decline in the value of trade from B to B' accompanying the outbreak of war. The harm to the trading relationship may be temporary or permanent. If the reduction in trade were permanent, postwar trade would conform to a nonpositive slope, such as the negative slope illustrated by B'D. If the impact of war were temporary, we would see a recovery in trade, illustrated by the positive slope of B'C. If war were to have no impact, we would see a continuous trend in the trade relationship, regardless of the outbreak of war. We could also see an increase in trade at point B. Similarly, the risk of war may affect prewar trading levels, in which case we might witness a negative slope in trade prior to the outbreak of war.

Empirical Analysis

It is useful to combine a statistical analysis based on interrupted time-series techniques with a visual examination of scatter plots of the dyadic trade flows for each of the seven dyads in the sample. Figure 14.2 illustrates the trade series

Figure 14.1. Hypothetical Impact of War on Trade Flows



for each of our seven cases. The point at which a war interrupts the trade time-series is demarcated with a broken line. Findings that we obtain with the interrupted time-series analyses should be visible in an inspection of the scatter plots.

Table 14.1 reports the results of each dyadic analysis, with each column representing a different dyad. We are interested in assessing whether war has a significant effect on trade relations and whether that effect is temporary or permanent. The scatter plots in figure 14.2 are useful for discerning the patterns in trade relations, but our statistical analysis allows us to determine the magnitude and significance of the effect. We first consider whether or not war leads to a decline in the level of trade between states composing the dyads investigated. This information is revealed in the coefficient for the war level variable. A negative coefficient for this variable means that the outbreak of war leads to a decline in the level of trade between states. Looking at the results for all seven dyads, we see that in five instances (Argentina–UK, UK–China, UK–Egypt, Cyprus–Turkey, and Greece–Turkey) the coefficient has a negative sign. But this apparent decline in trade after the onset of war is only statistically significant for one dyad; the outbreak of the Falklands War led to a dramatic reduction in the level of trade between the United Kingdom and Argentina. These patterns are corroborated with our scatter plot in figure 14.2.

We also see that dyadic trade sometimes increases after the onset of war, as in our statistical analyses of the Uganda–Tanzania and USA–China dyads. None of these positive coefficients for the war level variable are statistically significant, however, and the pattern is not easily discerned in the scatter plots.

There are several reasons why we might witness an increase in trade associated with war. First, the trade level reflects the value of goods traded, rather than the quantity of commodities traded. If war leads to restrictions on trade and consequently to shortages and to higher prices for the goods that are traded, the result would be an increase in the value of goods traded, even if the volume of

Table 14.1. The Impact of War on Dyadic Trade

	Argentina –UK 1870–1992 Falkland (1982)	UK–China 1870–1913 Boxer R. (1900)	UK– Egypt 1948–92 Sinai (1956)	Cyprus– Turkey 1960–92 Turco- Cypriot (1974)	Greece– Turkey 1886–1911 Greco- Turkish (1897)	Uganda– Tanzania 1968–85 Ugandan- Tanzanian (1978)	USA– China 1870– 1913 Boxer R. (1900)
Constant	49.607 (67.717)	103.449*** (4.462)	137.963 (153.760)	-0.665 (20.135)	4.801*** (0.668)	11.129** (2.979)	5.860 (3.361)
Trend	3.577*** (0.990)	-2.091*** (0.242)	-20.528** (9.053)	0.322 (2.280)	-0.012 (0.093)	-1.179* (0.456)	0.908*** (0.186)
War level	-462.398*** (90.619)	-2.254 (6.782)	-50.178 (150.310)	-11.343 (21.807)	-0.520 (0.717)	1.204 (3.511)	7.896 (5.604)
War rate	30.299* (15.561)	5.252*** (0.736)	43.641** (13.459)	2.409 (2.619)	-0.026 (0.118)	2.330** (0.712)	0.149 (0.584)
AR(1)	0.755*** (0.062)	0.225** (0.079)	0.763*** (0.101)	0.000 (0.001)	0.256 (0.199)	-0.002 (0.004)	0.011 (0.013)
R ²	0.78	0.81	0.83	0.21	0.28	0.50	0.79
Adj. R ²	0.77	0.79	0.81	0.09	0.15	0.34	0.76

Note: Standard errors appear in parentheses. * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

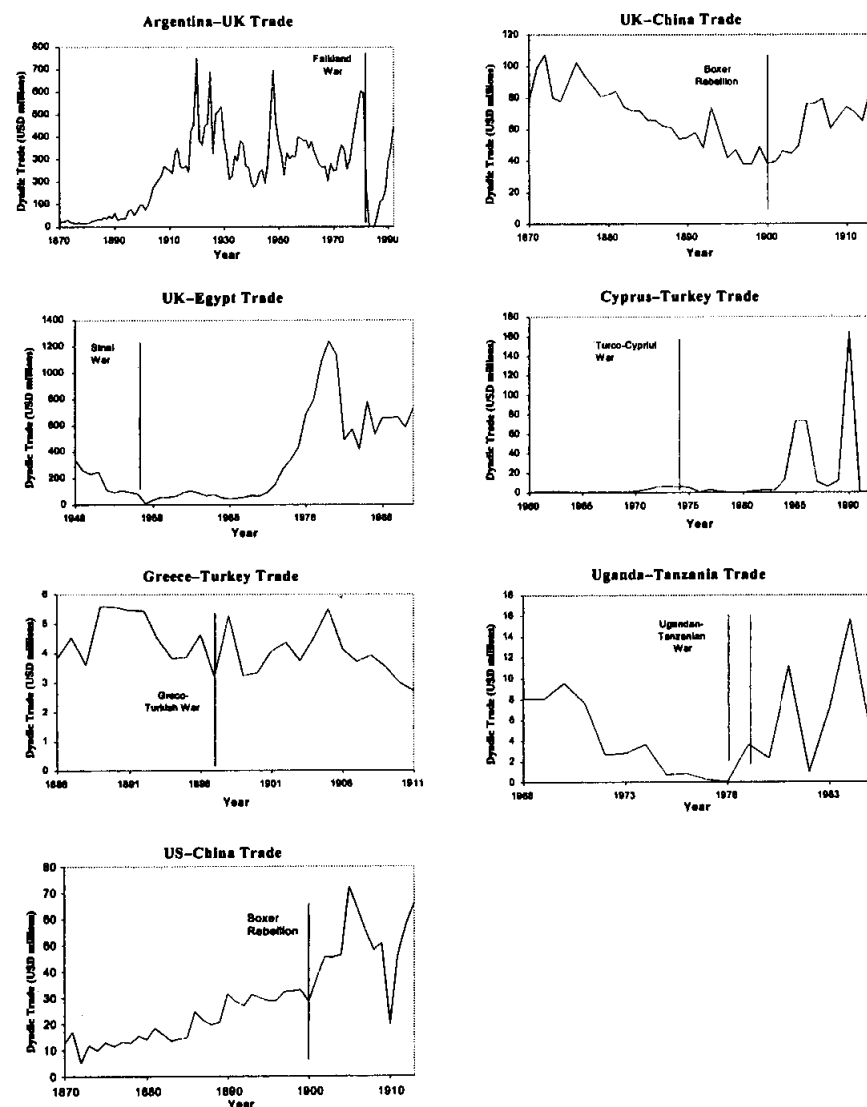
trade conducted were to decline. In addition, one of the motivations for war may be to create the conditions for an increase in trade.

A major objective for China's adversaries in the Boxer Rebellion was the opening up of China's trade. Therefore, it is not surprising that the war level variable for the USA and China is positive, with respect to the Boxer Rebellion. Although the UK–China dyad reveals a negative coefficient for the war level variable, trade does increase between these states after the Boxer Rebellion. China appears to open up to trade as a result of the war, but more slowly in the case of the United Kingdom than the United States.

In general, our findings for the war level variable demonstrate that trade suffers an immediate decline with the outbreak of war, but that the decline is rarely statistically significant. In fact, the decline is probably even less significant than our results reveal, since official reports exclude illegal trade carried on during wartime and thus underrepresent the trade being conducted. If the official reports reveal no dramatic decline in trade, we expect more accurate estimates of wartime trade with the enemy would reveal even less of a decline in trade. If anything, it might seem surprising that the official reports do not lead us to detect a more significant decline in trade levels for most cases. Admittedly, we are analyzing short wars, but all of these instances are cases that result in at least 1,000 battle-related deaths. That in itself seems serious enough to warrant an interruption in business as usual.

We next turn to the question of whether the outbreak of war has a permanent effect on a trading relationship. Liberal and realist theories of interdependence and war are less clear on this point, but we have argued that both theories imply that after a war between trading partners dyadic trade should usually (but not always) remain depressed and be slow to recover to prewar levels. A visual inspection of our scatter plots in figure 14.2 reveals that in most instances we see

Figure 14.2. Dyadic Trade



a rise in trade following the war. We can determine whether this trend is significant through the information provided in the war rate variable.

Table 14.1 reveals that in six of our dyadic analysis, the war rate variable is positive, meaning that the slope in the change of trade is positive for the postwar period (Argentina-UK, UK-China, UK-Egypt, Cyprus-Turkey, Uganda-Tanzania, and USA-China). In four of these six cases, the coefficient is statistically significant. This suggests that war's effect on trade is generally temporary.

In the majority of cases where war led to a decline in the level of dyadic trade (i.e., in four of the five cases with a negative war level variable), the war rate variable is positive. We find only one case (Greece-Turkey) with a negative war rate coefficient.

In the case of Greece and Turkey, we find negative coefficients for both the war rate and war level variables. One possible explanation for the failure of this trading relationship to recover from the war is that the postwar relationship is actually a prelude to other wars, the anticipation of which may keep trade low. The low levels of trade (averaging between 3 and 5.5 million dollars) and the negative trend in trade observed in the later years of the series may reflect a diminution in trade in the period leading up to the outbreak of the First Balkan War in 1912, the Second Balkan War in 1913, and the Greco-Turkish War in 1919. Unfortunately, we could not analyze the period surrounding the later wars, due to a lack of data for those periods.

The Greece-Turkey case raises the question of whether the anticipation of war leads to a deterioration in trade. The trend variable evaluates the prewar trading trend. A negative coefficient for this variable reveals that trade declines in each year prior to the war, while a positive coefficient for the trend variable reveals a positive slope in trade prior to the war. Table 14.1 reveals that our seven cases are nearly equally divided, where three dyads have a positive coefficient for the trend variable and four have a negative coefficient. Two of the three positive coefficients and two of the four negative coefficients are statistically significant. Trade, therefore, appears to be nearly equally likely to increase or to decrease in the period leading up to a war. In fact, we could imagine a set of equally plausible explanations for why the prewar period would experience either a positive or a negative trend. Hostilities may be so intense that they lead to restrictions or the breaking of trade ties even before the war occurs. Similarly, firms may be risk-averse and refrain from forging new deals with partners in a climate of uncertainty. On the other hand, businesses anticipating a war may rush to place orders or complete shipments for fear of a coming disruption to trade. For example, in some cases, legal restrictions to trade with the enemy still permit some allowances for firms to honor existing contracts. There would, therefore, be an incentive to increase trade prior to the war or at least to refrain from breaking trade ties.

To summarize, our empirical analysis demonstrates that there is some variation in the impact of war on trade across the dyads in our sample. In a majority of cases the outbreak of war appears to result in a decline in the level of dyadic trade, but for all but one dyad that decline is not statistically significant. In fact, we suspect that the real decline is even weaker than that suggested by our analysis based on official statistics, given the amount of illegal trade that may be conducted during wartime and excluded from official reports. Moreover, even when war leads to a decline in trade, that decline is almost always temporary; in general, trade increases in the postwar period. As to the period leading up to war, there is no systematic evidence that the anticipation of war usually results in a reduction in trade.

As mentioned, data limitations prevent us from providing a more comprehensive picture of the impact of war on trade. Governments often do not provide reports on wartime trade with the adversary. The fact that wartime trade data are also missing for other states suggests that the absence of trade reports does not necessarily imply the absence of trade. Even where data are complete, however, the fact that we are limited to annual data limits the number of observations, and this in turn makes it difficult to achieve levels of statistical significance with our interrupted time-series methods. This is compounded by the fact that nearly all of the wars in our sample are relatively short. As a result, in many cases we are left with a very small number of data points to measure the immediate impact of war on trade.

Our empirical tests of predictions of liberal and realist theories are also plagued by ambiguities in the theories, particularly for the period after the termination of war. Although both theoretical perspectives imply that trade will not quickly return to prewar levels after the termination of war, this is not a logical necessity, and there are some conditions under which we might expect a rapid recovery of trade. States may choose war as a means of opening up markets to trade, or they may want to rebuild the economies of their defeated adversaries in order to strengthen them and bring them into the balance of power against new enemies. Here we look at the aggregate effects of these contrary tendencies, but it would be useful in the future to hypothesize about the conditions under which trade increases immediately after war and to test these hypotheses against the evidence.

Our data are more reliable for periods after the termination of war, but the theoretical predictions are somewhat weaker. To the extent that political leaders' fears that war impedes trade is based both on the loss of trade during war and the slow recovery of trade after war, and to the extent that the experience of war generates hostility and continued sensitivity to relative gains, both liberal and realist theories predict that trade between wartime adversaries will not immediately return to prewar levels, but instead return slowly at best. If this is the prediction, it is clearly falsified by our analysis. In each of our cases trade increases quite rapidly within a few years after the end of war.

Extending the Empirical Domain

Anderton and Carter (2001a) make an important contribution by extending the analysis of the war-trade relationship to 27 additional cases. Their analysis includes 14 major power dyads and 13 dyads that contain at least one minor power, and it includes both short and long wars. While we have questioned Anderton and Carter's (2001a) case selection, methodology, and other aspects of their research design, and argued that they have overstated the strength of their evidence (Barbieri and Levy, 2001), we believe that Anderton and Carter have demonstrated that in many cases war significantly reduces trade between adversaries. The fact that their analysis is based on a larger number of cases and

greater diversity in the kinds of wars being analyzed, as compared to our own analysis, further enhances the credibility of their findings.²⁹ At the same time, our own findings of a number of other cases in which war does not have a significant negative impact on trade still stand, and Anderton and Carter do not challenge the internal validity of our findings for our particular cases. Because the total number of cases used to test the trade disruption hypothesis is still relatively small, we believe that the debate over the impact of war on trade is still up for grabs, and that this debate can be resolved only through further empirical research involving a larger number of cases.

Anderton and Carter (2001a) find that there is a statistically significant decline in the level of trade in 7 of the 14 major-power war dyads, with trade continuing to decline over the course of the war in a statistically significant manner in 8 of 14 cases (interestingly, 2 of the dyads exhibit a statistically significant increase in trade from the beginning to the end of the war).³⁰ Thus, for major powers, trade is significantly reduced in roughly half of the wars analyzed, with slightly more than a 50 percent chance that trade will continue to decline over the life of the war. In 12 of the 14 major power wars, there is a statistically significant increase in trade following the end of the war.

Anderton and Carter concede that the findings for their analysis of the impact of war on trade for 13 nonmajor power dyads are weaker than for the major power dyads. Their key indicator of the impact of war on trade levels is negative and statistically significant in 3 of 7 cases for major-minor short wars and 1 of 4 cases of major-minor long wars. This leaves 4 of 11 cases of mixed dyads for which war has a significant negative effect on trade. The 2 cases of minor power dyads (1 long and 1 short war) each show a statistically significant impact of war on trade. Thus, for nonmajor power dyads, 6 of 13 cases show a significant impact of war on trade, basically the same percentage as for major power dyads. For the long wars, 3 of the 4 cases of mixed dyads continue to witness a significant decline in trade over the course of the war, while for the minor power long war, the dyad witnesses a significant increase in trade over the course of the war. Finally, in all of the cases of mixed dyad long wars, we see a significant increase in trade following the termination of war.

Areas for Future Research

Some of the differences between Anderton and Carter's (2001a) findings and our own suggest potentially useful lines of inquiry for future research on the question of the impact of war on trade. The length of a war may be one factor influencing whether or not states witness a severe disruption in trade. The war-trade relationship might also vary for major power and nonmajor power dyads. Further research on both of these issues is required, because the major power dyads examined by Anderton and Carter all represent long wars. It is difficult to assess the relative importance and separate effects of the length of the war versus the types of participants in the war. We may find that it is the intensity of the

conflict, be it a short or long war, major or minor power participants, that explains trade disruption. Clearly, more research is needed to uncover the variations that exist in the war-trade relationship across dyads. We should note in this context that while we believe that war's impact on trade varies across dyads and that more attention must be paid to the factors that might account for dyadic variations, Anderton and Carter (2001a) seem to argue that, based on their evidence, the trade-disruption hypothesis is invariant across different types of dyads and types of wars.

These different conclusions derive in part from different views as to what constitutes appropriate evidence for the trade-disruption hypothesis. One point of contention is that Anderton and Carter (2001a) believe that the recovery of trade after a war provides evidence in support of the trade-disruption hypothesis. While we understand the logic of their argument, we do not believe liberal theory is sufficiently specific about the postwar implications for trading relationships to suggest that a recovery to trade constitutes support of the trade-disruption hypothesis. For example, the anticipated trade-related costs that liberals expect to deter war may not only refer to the loss of trade during the war itself but may also include the adverse consequences that war could have on the long-term health of the trading relationship. A leader would be more deterred from engaging in conflict with a trading partner if she/he anticipated serious harm to the trading relationship in the long term, rather than just temporary reductions in trade during the war followed by a quick resumption of trade.

Preliminary evidence that dyadic trade sometimes declines with the outbreak of war, sometimes does not decline, and occasionally even increases, suggests that future research on this question should shift away from the aggregate impact of war on trade, and attempt instead to identify the conditions under which war leads to a decline in trade and the conditions under which it fails to do so. While the question of the net effects of war on trade is clearly an important question worth pursuing, there are other equally important questions that also need to be investigated. For example, it is important to examine what type of trade continues, in what type of goods, between what type of adversaries, in what type of wars, and with what impact on states' war efforts and domestic economies. These questions are particularly important if we want to understand how the anticipated disruption in trade and the trading relationship after the outbreak of war affects political leaders' decisions regarding the resort to war.

Future research must do a better job specifying the possible sources for variations in the trade-conflict relationship across dyads. Recently, Green, Kim, and Yoon (2001) have highlighted the problems inherent in pooled cross-sectional analyses often employed in international relations research. They argue that we must account for the heterogeneous nature of dyads contained in large samples. While their particular solutions have been subject to debate (Oneal and Russett, 2001a; Beck and Katz, 2001; King, 2001), Green, Kim, and Yoon (2001) raise the important point about the need to account for the variations that exist across cases in space and time, which is highly relevant to trade-conflict research. Reuveny (this volume) raises similar concerns in arguing that

we need to look closely at dyad and commodity specific differences that exist in the trade-conflict relationship. He offers several examples of how we can move toward that goal through quantitative analysis. However, future research should also include qualitative analysis of specific cases. This will enable us to gain a richer understanding of the processes by which conflict affects trade and trade affects conflict.

Each of these research questions involves the objective impact of war on trade. An equally important set of questions concerns the expectations of political (and business) leaders regarding the impact of war on trade. This question of expectations is particularly important if our interest in the impact of war on trade is motivated by an interest in the more general liberal hypothesis that trade promotes peace, because it is the expectations of political leaders regarding the impact of war on trade that is relevant to their calculations of the costs and benefits of going to war and their decisions regarding war and peace.

Leaders' calculations regarding the likely economic costs of war are only one factor influencing their decisions, of course, and the relative weight of those economic factors must be compared to those of strategic, diplomatic, and domestic political considerations. Even if we were to accept Anderton and Carter's (2001a) findings that war has a statistically significant impact on trade half the time, it is not at all clear that this would be enough to induce leaders to decide against war, given the possible benefits of war anticipated by political leaders. This can be determined only by a more systematic empirical analysis of the extent to which trade considerations affect political decisions on questions of war and peace.³¹

This perspective leads to an important set of questions that require much more attention from researchers. What is the likely impact of war and trade as perceived by political and business leaders, and what is the impact of those expectations on their decisions? Do firms want to continue trade in search of profits or to cut back trade in an anticipation of increased transport and insurance costs? Are governments willing to permit trade to continue, either because of pressures from key economic groups or because of more general fears that the continuation of trade with the enemy is necessary for economic stability? Or are they driven by strategic concerns or patriotic pressures to prohibit trade? We should note that decisions to stop or reduce trade are not one-time decisions, and state policies on trading with the enemy may fluctuate as a function of the course of the war, its domestic economic impact, and demands from various domestic groups and organized political opposition.³²

Theoretical Implications and Conclusion

Our interrupted time-series analysis of patterns of war and trade for seven dyads demonstrates that the outbreak of war often fails to significantly reduce trade between adversaries, and that when trade does decline during war it often quickly returns to prewar levels after the end of war. Although the patterns do

vary, although our limited sample precludes us from formally generalizing to other cases, and although Anderton and Carter's (2001a) study raises further questions about the generalizability of our findings, our analysis raises possible doubts about the validity of the hypothesis that trade between adversaries will cease or be significantly reduced after the outbreak of war.

This trade-disruption hypothesis clearly follows from both liberal and realist theories of economic interdependence and war, which suggest, respectively, that the fear of the loss of welfare gains from trade deters political leaders from conflictual behavior that runs a high risk of war, or that relative gains concerns lead to the cessation or significant reduction in trade between adversaries after the outbreak of war. Because these hypotheses play a pivotal role in liberal and realist theories of trade and war, and because our findings draw some support from detailed historical studies of the phenomenon of trade between adversaries during wartime, it seems clear that investigation of the question of the impact of war on trade should be a high priority for future research.

As we noted earlier, our argument here is not with liberal and realist paradigms themselves, but rather with specific applications of those paradigms to the question of the relationship between economic interdependence and conflict. Contemporary liberal and realist scholars have framed the debate over trade and conflict in excessively narrow terms—they both focus primarily on the dyadic level and ignore the role of domestic actors and third parties. This represents a substantial departure from the liberal and realist paradigms that have shaped much of the debate in the international relations field.

There are a number of possible explanations for the trading-with-the-enemy phenomenon, and nearly all of these are in fact quite compatible with broader conceptualizations of liberal or realist theory.³³ Political leaders may fear that a cutoff of trade would result in a loss of trade to a third party or the alienation of neutrals. Alternatively, they may anticipate that the continuation of trade during wartime may create the opportunity to make relative gains at the expense of third parties or to gain influence over the adversary by making him economically dependent. Each of these explanations is compatible with a realist framework.³⁴

Political leaders may also be concerned about the domestic economic consequences and political costs of a cessation of trade. Key social groups may expect private gains from a continuation of trade with the enemy and may have the political power to block the government from imposing restrictions on such trade, as the government may be dependent on the economic support of leading commercial and financial interests for the financing of the war effort. Each of these explanations is compatible with a liberal (or Marxist) conceptual framework.

While debate continues about the aggregate effects of war on trade and of trade on war, it is clear that each of these relationships is conditional rather than universal, that scholars need to devote more attention to identifying the conditions under which each of these relationships holds, and that a complete specification of these conditions will involve some variables associated with liberal

theories of interdependence and conflict and some variables associated with realist theories. Thus a fully satisfactory theory of trade and conflict will have to build on insights from both liberal and realist perspectives.³⁵ Such a theory will have to incorporate a range of key factors that enter political leaders' cost-benefit calculations regarding decisions for war and decisions to maintain or suspend trade in the event of war. These include leaders' fears of the impact of war on the welfare gains from trade; expectations of the impact of a cessation of trade on the domestic economy, on the ability to sustain the war effort, and on the support of key economic interest groups for the government and for the war effort; and expectations regarding the effects of the maintenance or cessation of trade on the relative position of potential economic and military rivals.

Notes

This is a revised version of Barbieri and Levy (1999), in which we incorporate some material from Barbieri and Levy (2001). We would like to thank Martin Edwards, Andrew Enterline, John Geer, Peter Liberman, Helmut Norpoth, Brad Palmquist, Daniel Verdier, and especially Mark Crescenzi for their assistance and for their valuable comments; Michael Ault, Joseph Gochal, and Oliver Selwyn for their research assistance; and Stuart Bremer for providing war data and for helpful advice. The data used in this study are available at <http://www.vanderbilt.edu/psci/barbieri/>.

1. While Anderton and Carter (2001b) note the discrepancy between our primary focus on the empirical validity of the hypothesized linkage between trade and peace and their primary focus on the linkage between war and trade, they frame their initial study (Anderton and Carter, 2001a) in terms of the trade-promotes-peace hypothesis.

2. The underlying assumption is that trade is more efficient than conquest for expanding markets and investment opportunities (Rosecrance, 1986), at least in the last century.

3. The less dependent party may be tempted to use economic coercion to exploit the adversary's vulnerabilities and influence its behavior relating to security as well as economic issues (Baldwin, 1985), which can lead to counterthreats, conflict spirals, and war. In addition, resource scarcities can lead to economic competition and rivalry (Choucri and North, 1975) and under some conditions economic rivalries escalate to strategic rivalries and war (Levy and Ali, 1998).

4. For reviews of the theoretical arguments and empirical findings, see McMillan (1997), Barbieri and Schneider (1999), Mansfield and Pollins (2001), and Schneider, Barbieri, and Gleditsch (this volume).

5. Although some realists argue that strategic goods are especially important in relative gains concerns, Gowa (1994), who has been particularly influential in the contemporary literature, focuses on aggregate levels of trade. Gowa (1994) argues that states choose to trade with allies in order to avoid granting the gains from trade to adversaries, which may result in security externalities. It is not the adversary's increased income from trade that is of greatest concern, but the ability of the adversary to enjoy the gains arising from specialization (in international trade theory, gains from trade include both increased income and specialization). By permitting its adversary the opportunity to increase its productive efficiency and redirect resources away from alternative productive ventures, the adversary is better able to increase production of military resources and hence pose a potential challenge.

6. We use the term 'trading with the enemy' to refer broadly to trade, finance, and other forms of economic cooperation between adversaries. This is standard usage in the literature and also in many state statutes on 'trading with the enemy'.

7. Six days after Pearl Harbor a U.S. presidential edict created legislation for the granting of licensing arrangements for trading with the enemy, and there are countless examples of American firms doing business in strategic goods with Nazi Germany during World War II. Standard Oil of New Jersey, for example, sold oil to Germany through Switzerland while Allied forces suffered shortages, and Ford Motor Company sold trucks to Nazi forces in occupied France (Higham, 1983; Aarons and Luftus, 1994).

8. We might hypothesize that the impact of war on postwar trade will be a function of the duration of war and other measures of the seriousness of war. Alternatively, the key variable might be the type of war rather than its duration. Rasler and Thompson (1989) suggest that the economic impact of global wars (on GNP, public expenditures, and public debt) is greater than that of other interstate wars involving the great powers. See also Vasquez (1993: 52–53).

9. Victorious states sometimes have strong economic or strategic incentives to rebuild the economies of the losers after the war, which may increase trade, as illustrated by the experience of the United States and both Japan and Germany after World War II.

10. This is exacerbated by risk acceptance in the domain of losses, as prospect theory suggests (Levy, 1997).

11. Liberal and realist theories imply that trade between adversaries should be depressed during periods leading up to war, but not as much as during war itself.

12. Scholars have analyzed the effects of relative gains concerns in multipolar systems, but they have not applied these analyses to the phenomenon of wartime trade. See Snidal (1991a), Powell (1991), Gowa (1994), Lieberman (1996), Werner (1997).

13. For an economic model of the simultaneous presence of arming, conflict, and trade, but one that is based on a rather different set of assumptions, see Skaperdas (1996).

14. Liberman (1996) looks at trade between adversaries during periods of hostility prior to war (Britain and Germany, 1890–1914; United States and Japan, 1930–41), but we have argued that trade between adversaries during periods of rivalry or militarized conflict short of war is less anomalous than trade between enemies during war. Even Liberman (1996: 173) argues that 'relative gains block cooperation among states only at the brink of war,' which implies that trading with the enemy during wartime should not occur.

15. This reflects a more general lack of attention by international relations scholars to the economic consequences of war, though there have been some important recent exceptions (Organski and Kugler, 1980; Goldstein, 1988; Rasler and Thompson, 1989; and Modelski and Thompson, 1996).

16. This systemic-level finding does not necessarily imply that major power war reduces trade between states at the dyadic level, though this is a plausible hypothesis that needs to be tested.

17. In an earlier version of this chapter, we used ARIMA analysis to explore the impact of war on trade (Barbieri and Levy, 1997). The findings presented here are consistent with those derived from the ARIMA analysis.

18. The trade statistics reported by the importing nation are used to calculate dyadic trade unless these data are missing, in which case we rely upon the exporting nation's trade report.

19. A large portion of the data for the post-World War II statistics were derived from the International Monetary Fund's *Direction of Trade Statistics*, made available by the Inter-university Consortium for Political and Social Research.

20. We used a slightly extended version of the dataset reported in Small and Singer (1982).

21. We choose not to interpolate data points, since we are interested in discovering variations in trade flows and did not wish to assume a continuous trend in the series. Since it is difficult to distinguish missing trade reports from zero trade, we make no assumptions about the value of missing reports.

22. We have one exception to this rule. For the UK–Egypt dyad, we had only eight years of data prior to the Sinai War. The cases that were excluded were far less complete, in terms of continuous series.

23. Of the wars since 1816 contained in the COW Interstate War dataset, approximately 67 percent lasted less than one year.

24. We thank Jacek Kugler for suggesting this point.

25. For other issues related to measurement, see Barbieri (2003a, b).

26. We used EViews Version 3.0 for all analyses performed here.

27. We investigated whether Autoregressive (AR) and Moving Average (MA) processes were present in the series by inspecting correlograms. In preliminary tests, we identified an AR (1) process in many dyadic trade series. The models were estimated initially with a lagged dependent variable, which served to account for the process and allow us to overcome problems of autocorrelation. However, we follow the recommendation of reviewers that we include the AR (1) parameter and exclude the lagged dependent variable. Our results do not change significantly when using these alternative approaches. For details about EViews' estimation techniques, see the help file document, 'How EViews Estimates AR Models.'

28. Figure 14.1 is an adaptation of Figure 3 in Lewis-Beck (1979: 1130).

29. Of Anderton and Carter's (2001a) 27 dyads, five are from World War I, six are from World War II, and two are from the Korean War. The possibility that a state adopts similar policies toward its different wartime adversaries, or that allies adopt similar policies in order to maintain alliance cohesion, raises questions about the number of truly independent cases in their sample (Barbieri and Levy, 2001: 622).

30. Anderton and Carter (2001b) make the important point that if the anticipation of war leads to a substantial drop in trade between adversaries, as it sometimes does, we might fail to see a significant decline in trade with the outbreak of war because trade is already near zero and there is little room for further decline. Additional research is needed to uncover the impact that the anticipation of war might have on trade patterns.

31. The expectations and calculations of business leaders are also relevant. Their expectations about the impact of war on trade, and particularly on their own profits, will influence their own decisions as to whether to pressure the government to allow trade to continue and whether to attempt to circumvent any restrictions that the government might impose.

32. During the War of 1812, for example, the United States alternated between an economic embargo against British goods and much more open trading policies (Levy and Barbieri, 2001).

33. We analyze alternative explanations for the trading-with-the-enemy phenomenon more fully in Levy and Barbieri (2001).

34. This argument about the need to conceptualize relative gains in systemic rather than dyadic terms draws support from theoretical work on relative gains (Snidal, 1991a;

Powell, 1991), which suggests that relative gains concerns diminish as the number of actors in the system increases. For more specific theoretical discussions of the role of relative gains in trading relationships see Morrow (1997) and Werner (1997).

35. For a recent study that attempts to incorporate both liberal and realist hypotheses into a single theory of economic interdependence and conflict, see Papayoanou (1999).