The Price of War:

The Mid-Atlantic Grain Trade from the Seven Years' to the Napoleonic Wars

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Between 1689 and 1815, France and Great Britain fought seven times and were at war more than half of those years. The Nine Years' War (1689-97), the War of Spanish Succession (1702-1713), the War of Austrian Succession (1739-1748), the Seven Years' War (1756-1763), the War of American Independence (1775-1783), and the Revolutionary and Napoleonic Wars (1793-1801 and 1803-1815) totaled some sixty-five years of warfare, wars that over time became increasingly costly and evolved from conflicts fought primarily on the continent into international wars of empire. And it is well to remember that the periods of peace between these wars often saw Great Britain engaged in localized struggles or naval conflicts.[1]

British historians have tried to link the wars of the "long eighteenth century" to the remarkable growth of the British economy during that era, to the increasing complexity of the British state and its growing penetration of British society, and to the forging of a national identity by the British people. Culturally, war helped shape the self-conception of the English, Scottish and Welsh peoples as Britons, and arguably the Seven Years' War had a similar if less definitive impact on those of British ancestry in North America. The costs of these wars, and the ever greater mobilization they required of both productive and human resources, also unarguably helped strengthen the modern British state; and despite the loss of the United States, strengthened Great Britain as an imperial world power as well. Economically, however, the picture is far less clear. The correspondence between sustained economic growth and martial exploits during the eighteenth century may be little more than coincidence. Cause and effect

analysis might well not withstand the type of counterfactual tests that economic historians delight in, and, in any case, the growth rate for the British economy during this period was actually fairly modest. How then did war matter to the British economy? War opened new markets, caused short-term disruptions of specific industries, provided a stimulus for other industries, pulled the underemployed out of the agricultural labor force, taught merchants to think more systematically about risks and rewards. To paraphrase a recent scholarly comment on the question, what is most striking about the era is that Britain's century of war had few damaging long-term economic consequences.[2]

Historians of eighteenth-century Britain have thus produced masterful studies of the impact of war on the society and economy of that island nation. Where do Britain's North American colonies and the new United States fit in this picture? Through 1763, Britain's North American colonies were a battleground for these wars, and after 1775, Britain's wars were either fought against the United States or decidedly threatened United States commerce. Historians of the late colonial period and the young republic, while not ignoring the question of how war affected commercial activity and everyday life, have tended to produce much more focused studies than their British counterparts, dealing with specific aspects of questions about war and American society.[3] Here we will remain within that tradition, limiting ourselves primarily to the mid-Atlantic, and, in particular, the Lower Delaware Valley, and focusing on the regional grain economy. We will, however, extend the scope of such work chronologically by considering the period 1750-1815. We will begin with a brief overview of the Seven Years' War – a classic example of how the wars of the first three quarters of the eighteenth century disrupted and stimulated the grain economy, and then turn in more detail to the Revolutionary War and the

Napoleonic Wars. While we will consider the distinctive positioning of farmers, millers, and shippers in each of these wars, our primary attention will be on the Lower Delaware Valley's merchant millers, who were the hum of the region's grain economy.[4]

Prologue: The Seven Years' War

The Seven Years' War (1756-1763) unfolded on a stage that stretched from the Atlantic to the Indian oceans, and was fought in the woods of the American backcountry, the shipping lanes of the Caribbean, and the dominions of the East India Company. If the crucial political decisions that brought on the war were made in Paris and London, the fighting began in the early 1750s in the Ohio Valley. Skirmishes between French troops and British settlers and fur traders, and their respective Native American allies, led to the dispatch in 1754 of British General James Braddock to America, and, in 1755, when he led an army to the Ohio to quash the French threat, to one of the worst military defeats in British history. From there, if possible, the war went from bad to worse for the British and their American colonial allies. French forces captured forts at Oswego, defeated a British fleet off Minorca and then captured the British outpost, found themselves engaged by proxy in Frederick of Prussia's assault on Austria, and then lost Fort William Henry in New York, a loss that was followed by the killing by the French Indian allies of many of the troops and camp followers who had surrendered. It was not until 1758, after three years of fighting, that the tide turned. In 1758, the British took Louisbourg, "the Gibraltar of the North," that guarded the sea lanes to French Canada; Fort Frontenac, that anchored the western end of the Saint Lawrence River, and Fort Duquesne (which the French abandoned and destroyed) in the Ohio Country. They would go on to successfully assault Quebec (1759) and

Montreal (1760), and bring the war to an end, even if the Treaty of Paris was not signed until 1763.[5]

Economically, for residents of the mid-Atlantic, the war had several immediate consequences. The war closed off some traditional markets, most crucially those in the French Caribbean, but British victory held out the prospect that colonists might gain access to previously restricted ones. The war also brought British troops to North America--several thousand by the late 1750s--and these troops needed provisions, which raised local farm prices, assured a growing supply of European coin, and, in turn, improved demand for British imports. For farmers this meant more consumer goods; for merchants, greater profits; for laborers, higher wages. Finally, the war opened up high-risk opportunities in privateering, and even riskier choices for those desperate enough to enlist for bounty money. When the fighting ended, those merchants who had gambled too much on the import trade, went bankrupt, while for urban laborers, widespread unemployment replaced the prosperity of the late 1750s.[6]

The movement of wheat prices charted a course for the Lower Delaware Valley grain economy along a path laid out in each preceding war. In 1744-1749, wheat prices had reached a new high at approximately four shillings six pence (4/6) a bushel, as a result of Portuguese demand and hopes that war was about to end in Europe. Neither farmers nor merchants could know that this peak was "permanent," and that demand had pushed prices to a new plateau and assured a period of unprecedented opportunity for grain producers from southern Connecticut to the northern and western Chesapeake. Prices stabilized (after the 1744-49 upswing) through the renewal in 1755 of hostilities between France and Great Britain, but war brought a sharp decline of trade at the port of Philadelphia, problems in the southern European market (the outlet for

most Delaware Valley wheat), and even greater problems in the West Indies (the primary market for corn and flour). With shipping now at risk, both Portuguese and British wheat prices went up (see Graphs 1 and 2), but local prices remained depressed (the pattern, which we might call "symmetrical divergence" generally characterized the outbreak of war, as the initial confusion of war made it difficult to match supply to demand). Temporary British trade restrictions—on shipping grains out of Philadelphia and, at other times, on shipping grains anywhere but Great Britain—further compound the problems facing Lower Delaware Valley local farmers, millers, and merchants. Despite the embargoes, by 1758 European demand was registering along the Delaware, and ratcheted prices back up to over five shillings a bushel by 1760 and, even as the region's economy collapsed at war's end, to over six shillings by 1763. The eventual fall of wheat (and flour) prices, that mirrored price behavior for other commodities and the pattern that concluded each eighteenth-century war, was neither sharp nor sustained, as southern European demand remained strong. The sideways "S-shaped curve" that wheat prices had charted since the early 1750s reflected the imperfect communications, unsettling economic circumstances, and real commercial risks that defined the impact of war on the grain economy.[7]

The American Revolution

Fighting between Great Britain and the American rebels began in the fall of 1775 in New England, but it would be many months before the mid-Atlantic would be drawn directly into the hostilities. The British landed on Long Island in August of 1776, forced George Washington's forces to abandon Brooklyn and New York City, chased them across New Jersey, and then suffered humiliating defeats at Trenton and Princeton that winter. The first year and a half of

war thus passed with most of the mid-Atlantic, except for the immediate vicinity of New York City, relatively undisturbed by war, but with the British navy already in control of the Delaware and Chesapeake Bays. While the British northern campaign down Lake Champlain in the summer of 1777 turned into a disaster for General John Burgoyne, American attempts to stop William Howe's advance on Philadelphia led to a major defeat at Chadd's Ford on the Brandywine Creek in September, the occupation of Philadelphia, and another American defeat at Germantown, followed by the first terrible winter (1777-1778) for the rebels at Valley Forge. The British remained in Philadelphia until June of 1778, then moved to New York, pursued by Washington and engaged at the battle of Monmouth Court House, before both armies settled in, the British in New York City, and the Americans in Westchester County. While fighting between patriots and loyalists would continue in New Jersey for the duration of the war, and regular army units would revisit the region periodically, this brief period from the winter of 1777-1778 to the summer of 1778 witnessed the most intense disruption of the Delaware Valley economy.

The Revolutionary War bled the mid-Atlantic. Alan Kulikoff, in the most recent and most comprehensive survey of the impact of the war on rural America, concluded:

> As war ground on for seven years, the farm economy nearly disintegrated, foreign trade disappeared, local exchange atrophied, labor became ever more scarce, and the destruction and terror of war, perpetrated by both sides, threatened tens of thousands of farm families.... The Revolutionary War....turned the lives of farmers --even those far from the battlefield--upside down.[8]

The problems faced by farmers near war zones could be every bit as bad as Kulikoff describes. What crops and livestock the patriot and British armies did not requisition were routinely plundered, and the American army paid in depreciated, virtually worthless continental currency or in promissory notes of equally dubious value. The British, and later the French, paid in coin,

but over time, the supply wore down, and general foraging often replaced purchasing. Even when local provision markets existed, farmers could not find the harvest help they need to bring in wheat crops as the army absorbed unattached laborers, farm sons, servants, and the war cut off the supply of new immigrant laborers. Shipping provisions out was virtually impossible – the British West Indies was now officially closed to American vessels, and while after 1778, patriot merchants had added incentive to supply the French and Spanish Caribbean, each venture was accompanied by enormous risk of capture by British naval forces or privateers. Even more disturbing, in some communities, was the terrible destructiveness of the war: in the combat zones of Westchester County, on much of Long Island, in the New York-Philadelphia corridor of New Jersey, along coastal Connecticut (where the British launched raids repeatedly), in the Lower Delaware Valley (where the target was the grain mills), and on Maryland's Eastern Shore. Murders, rapes—more common than often remembered--, homes and barns destroyed, cattle run off, and mills burnt marked the partisan warfare and became a pattern for marauding troops on both sides. Finally, the sustained British occupation of New York City and shorter occupation of Philadelphia disrupted established shipping concerns and created an enduring economic legacy that led to numerous post-war bankruptcies.

Without disputing any of this, it is still worth issuing a caution to Kulikoff's overall assessment of the war's local, civilian impact. As he himself notes, wage rates for laborers and hire rates for teamsters actually went up during the war. For some, at least, the provisions trade provided unique opportunities to profit, just as some merchants and millers adjusted to the wartime risks successfully and secured contracts to supply the armies. Account books indicate that many farmers kept their records in the local currency of exchange, avoided the perils of

depreciating continental currency, and sold and traded goods at somewhat better prices than they might have before the war. Moreover, regions that were battered by heavy fighting and pillaging troops one year, often rebounded the year thereafter. The point here is not to deny the hardships caused by the war, which unquestionably produced the worst civilian experience of any war in American history, but to recognize that assessing that experience is again a matter of drawing up a balance sheet of risk, profiteering, calamity, opportunism, and simply survival.[9]

The grain economy moved through three phases during the war for independence. It began and ended well but broke down in the middle. The first phase lasted from the start of the war roughly until 1777, and for many people involved in the Lower Delaware Valley's grain trade it marked the most lucrative period. This initial phase of prosperity carried over the from the Seven Years' War, indicating that war was good for people involved in food production and distribution. Farmers in the Lower Delaware Valley harvested huge crops of wheat in the early 1770s, especially in 1775. Pennsylvania farmers alone produced over one million bushels of surplus grain. Although markets had slumped during the mid-1760s, demand for grain and flour had reached an all-time high in 1772, and continued strong as the war broke out in North America. As a result, farmers, millers, and merchants in the Lower Delaware Valley were shielded from the harshest effects of the imperial crisis, and individuals reaped windfall profits in 1775 and 1776.

The boom times ended around the British invasion of the Philadelphia region in the summer of 1777, starting a second phase marked by difficulty and suffering that lasted through 1779. Philadelphia's occupation by the British from the fall of 1777 to the summer of 1778 effectively shut down the region's economy. In large part because General Washington ordered

the removal of millstones from the Lower Delaware Valley's largest mills, following the loss in the Battle of the Brandywine, to prevent supplies from ending up in the enemy's hands. No surviving records indicate how many millstones the Continental troops removed. In 1776 there were as many as fifty flour mills between Philadelphia and Wilmington, but it seems clear that the Brandywine mills were the main targets despite the millers' declarations of patriotism. The Brandywine millers raised suspicions and fears because they were Quakers and their mills produced more flour than others in North America. In the weeks preceding the Battle of the Brandywine, General Anthony Wayne used Brandywine miller Joseph Tatnall's home as his headquarters in Wilmington. Tatnall promised, "I cannot fight for thee, but I can and will feed thee." He was not given the chance to fulfill his promise. Washington's order brought business at the Tatnall & Lea mill to a halt on November 8 when soldiers carted away two pairs of millstones and hid them in Chester County. The Brandywine mills sat idle for ten months.[10]

The British navy also played an important role in bringing the early boom times of war to an end by interfering with overseas trade. The British blockaded the Chesapeake and Delaware bays for the first time in the winter of 1776-1777. Rather than completely blocking commerce, the British navy stopped trade in the Lower Delaware Valley on an intermittent basis throughout the war.[11] The combination of British blockades and privateering reduced the number of vessels reaching destinations because of seizures, and decreased the number of vessels in trade because of the fear they incited among merchants unwilling to risk their property. In addition, Congress passed an embargo in 1778, prohibiting the export of grain and flour. By 1779 Philadelphia's exports had been reduced to a trickle. Overseas trade from Philadelphia fell to between one-fifth and two-fifths of its prewar size. The volume of Philadelphia exports, largely breadstuffs,

dropped from over sixty thousand tons in 1773 to less than four thousand tons in 1779. Although a few merchants continued to risk running blockades and fighting privateers to reach overseas markets after 1777, most had given up. With limited access to export trade, supplying the army became the only real market left open to the grain community between 1777 and 1779.[12]

The war's southern campaign combined with the return of good crops and the reopening of overseas trade in 1780 pulled the region out of its economic downward spiral and into the war's third and final phase of economic recovery. The patriot forces passed through the Lower Delaware Valley in the spring of 1780, again in the spring of 1781, and finally in the fall of 1781 on their way to Yorktown, but permanent occupation and fighting were over for the region.[13] Between 1779 and 1781 the Continental army declined from 24,000 soldiers to under 10,000. A number of these men returned to tend the Lower Delaware Valley's fields. Free from troop disruption and pillaging, grain harvests improved in 1780 and 1781.[14] In response to the French and Spanish governments opening of markets in the West Indies to American commerce, the atrophying grain economy whipped itself back into shape in the early 1780s. By 1781 Congress' superintendent of finance, Robert Morris, was able to speak positively about the region's flour production and commerce. "All our ships have been and continue to be constantly employed in carrying flour to the French and Spanish islands." This trade supplied Philadelphia merchants with West India produce, European manufactures, and most importantly as Morris noted, "many Spanish dollars."[15]

Whereas the French forces in North America provided a small but lucrative market for the Lower Delaware Valley's grain and flour producers, Spain's markets were larger and

centered in the West Indies. Through its port city of Havana, Cuba was the clearinghouse for Spain's colonial commodities and its principal military outpost in the New World. The interruption of commercial relationships during the war for independence created new markets for Americans to transship Cuban tobacco and sugar. At the same time, the war increased Cuban demand for flour as Spanish troops moved into the region and the military stockpiled provisions. Between 1779 and 1783 Cuba grew into a significant market for American flour and an even more important source for cash. Flour purchases in Havana, not including the military, grew from over ten thousand barrels in 1779 to over sixty-five thousand barrels in 1783.[16] The French and Spanish alliances transformed the American Revolution into an imperial war, and while the Lower Delaware Valley's grain producers found themselves for the first time fighting on a different side, the shift made doing business during the war more familiar.[17] Still, although trade improved between 1780 and 1783, recovery was fraught with difficulties for some time to come.[18]

The American Revolution marked profoundly new experiences for the Lower Delaware Valley's grain community. In the end, the balance between benefits and disruptions tipped in favor of benefits for the Lower Delaware Valley's grain community but different groups were more or less adversely affected by the war. While the region's farmers, millers, and merchants generally shared in the prosperity of the Seven Years' War, the Revolutionary war experience was more uneven for the terms of trade, and profits were more unequally distributed in the grain community. The region's biggest winners were the handful of merchants who made large fortunes from blockade-running, privateering, and supplying army contracts, while millers found themselves in an unenviable position among the war's biggest losers.

"I suppose you are like the rest now in trade making thousands every day," Caleb Ricketts wrote to Levi Hollingworth in the fall of 1778 after the British pulled out of Philadelphia.[19] Ricketts' expressed a widely-held opinion about merchants, the war, and profits. While not all merchants made fortunes in the Revolutionary War, some in the Lower Delaware Valley's grain trade did. During the war's first years merchants, such as Robert Morris, shipped large quantities of wheat and flour to the West Indies and southern Europe, and after 1780 traded actively with agents in Havana and other Caribbean ports. Embargoes and blockades helped drive up prices and increased profits for those who successfully landed cargoes overseas.[20] But not all fortunes were made in blockade-running.

There was money to be made right in the Lower Delaware Valley. For example, Levi Hollingsworth used the war to make himself into one of Philadelphia's leading merchants without shipping a single good overseas. Fueling the military machine lined the pockets of a few Lower Delaware Valley resident entrepreneurs, and it also reinforced the expansion of late-colonial internal exchange networks—collecting, transporting, storing, and marketing commodities, connecting consumers with producers, and capitalizing and managing new enterprises. Hollingsworth's position in Philadelphia and his connections in the Delaware Valley and the northern Chesapeake landed him numerous military contracts. In 1779 the Continental army's quartermaster department turned to Hollingsworth for wheat and flour, believing that he could "expedite the grinding of the wheat [and] the transportation of the flour."[21] During the war Hollingsworth filled several orders for the Patriot forces. After 1781 Hollingsworth also took advantage of Morris' new military supply system. In the summer of 1782 he sent William Ferguson, one of his clerks, to Delaware and Maryland to fill a contract for twelve hundred

barrels of flour for the army. Ferguson's letters from the field demonstrate how Hollingsworth used his flour network for his personal gain.[22]

Transportation provided a major source of his wealth. Before the war Hollingsworth already owned one of the region's busiest shallop services at Christiana Bridge in Delaware, connecting Philadelphia to the Chesapeake Bay. Already a busy route, the British blockade of the Chesapeake and Delaware bays during the war increased traffic along this internal passage. By 1782 Hollingsworth had increased his freight business to include four wharves.[23] In particular, he successfully outbid competitors for contracts to supply and carry goods for the French. The arrival of the French fleet in America in July 1778 created a frenzy as farmers, millers, military purchasers, and speculators scurried to cater to their new allies. The French forces in America averaged around twelve thousand soldiers and sailors, but the significance of the allied market was not its size but rather the silver its commissaries paid with. Hard money became increasingly scarce in the Lower Delaware Valley as foreign trade declined after 1776.[24] By the end of the war Hollingsworth controlled as much as two-thirds of the region's total freight and enjoyed the benefits of his French connection.[25]

Hollingsworth's wartime success did not go unnoticed. He found himself at odds with Philadelphia's committee movement in the summer of 1779, accused of withholding flour from the city's residents. His papers and goods were seized, and he was even jailed for a brief period. The investigation turned up nothing and he was freed and cleared of all charges.[26] Hollingsworth's associations and past conduct made him suspicious to committee members. His wife's family was Quaker and loyalist, although Hannah had been warned out of the meeting for marrying outside of her faith. It was widely believed that Hollingsworth sided with the British

during Philadelphia's occupation. In August 1778 Amos Alexander, a miller from Lancaster County, wrote Hollingsworth "that part of your conduct I referred to was your going in to the enemy, which notwithstanding you call it being made a prisoner, your warmest friends here believe to be voluntary."[27] Hollingsworth's associates suspected his patriotism even before the British captured Philadelphia. Samuel Patterson rebuked Hollingsworth for his Quaker connections as early as 1774 and in 1777 warned him to "be carefull of what you say, [I] should be sorry you would expose yourself."[28] However incriminating these statements seem, no direct evidence survives that proves Hollingsworth was a loyalist. In fact, Hollingsworth probably represented the conservative position of the majority of merchants in the Lower Delaware Valley during the American Revolution.[29]

Early in 1781 Thomas May declared that "milling is a very bad business." Indeed, the Revolutionary War appears to have disrupted millers' affairs more than any other group in the region's grain economy. The Lower Delaware Valley's mills became military targets and several were destroyed. For example, British troops burned William Cooch's Delaware mill to the ground during a skirmish on their march to Philadelphia in 1777. The next month Redcoats raided the Tatnall & Lea mill's grain stores and burned the cooper-shop during the Battle of the Brandywine. Yet, total destruction was not the only way war disrupted milling. The most famous case was Washington's removal of the Brandywine mills' millstones. The impact of British occupation can be extrapolated from the surviving records for the Tatnall & Lea Mill. The number of transactions in Thomas Lea's daybook dropped from an average of one hundred per month in 1774-1776 to a total of six during the occupation of Philadelphia. Unable to grind

wheat, Lea managed other business activities including pasturing cows, hauling wood, and weaving.

The accounts belonging to the region's millers reflect a steady decrease in flour production from 1776 to 1779. Thomas Lea's Brandywine mill daybook shows a drop of sixteen thousand bushels of wheat between 1776 and 1777 alone. The battle of the Brandywine followed by the occupation of Philadelphia interrupted Lea's purchases from the fall of 1777 through the summer of 1778. Lea did not buy wheat until after August 8 when John Welsh carted the millstones back from their hiding place in Chester County. Four days later, with millwrights hard at work reinstalling the millstones and laborers clearing debris from the race, Lea purchased 1,875 bushels of wheat. By the close of the 1778 harvest season Lea bought over thirteen thousand bushels of wheat, some of which farmers held over from the 1777 harvest. Lea milled over one half of his purchases from the 1778 harvest for the Continental troops. Despite military contracts Lea's business remained small in 1778-1779, especially in comparison to the prewar period or even the first year of the conflict. Lea's grain stock had fallen by more than two-thirds since the start of the war.[30]

Table 1 Wheat purchased by Thomas Lea, Brandywine Mill, 1776-1779

Harvest Year	1776	1777	1778	1779
Wheat (bushels)	24,000	7,974	7,420	7,533

Source: Thomas Lea Daybook, February 20, 1775-September 27, 1783, Historical Society of Delaware.

However, numbers of other millers in the region were put to work for the Continental army during the war. For instance, John Simonton of Newark, Delaware explained "I ame not master of mill," in the summer of 1778, "I am imploy'd in continental business and when I can do aney thing for myself I cannot tell." Simonton's neighbor James Black found himself in a similar situation that fall, "grinden any little we do for the contenentl," and none for Philadelphia's market. On the Eastern Shore quartermaster Henry Hollingsworth commandeered a number of mills, arguing that "there can be no quantity [of flour] made but for the states." Receiving continental certificates or paper money for their flour, Simonton, Black, and scores of other millers profited little from their efforts. And they may have even envied the Brandywine millers and others in Chester County who could do no business during the year the army occupied the region.[31]

Discussions about labor scarcity during the war typically focus on its affects on grain production. However, the loss of key laborers at mills also affected flour production between 1776 and 1779. While some of the region's millers set aside their business and went to war, few shared the passion of Samuel Patterson from Christiana Bridge. Patterson was a fiery-tongued patriot who served as a colonel in the Continental army, calling "the Great and Grand Struggle…for Liberty in America with that Scoundrel George…one of the most Virtuous [causes] that ever was in history or ever will be." Patterson led farmers and craftsmen from throughout the Lower Delaware Valley whose military service greatly depleted the region's milling industry. Because his "coopers and millers [had] goan to fighting for a lively hood," Thomas Gilpin temporarily gave up milling on Big Elk River in late 1776. Similarly, when John

Simonton's waggoner and assistant miller enlisted in the army in 1777, he found himself with "no kind of business".[32]

The enlistment of local men skilled in the art of cooperage seems to have disrupted flour production in the Lower Delaware Valley most of all. Although the exact number of enlisted coopers remains elusive, evidence documents the significant impact of their absence on the grain economy. As early as 1776 the lack of casks became obvious, and was further exacerbated when more local coopers took up arms during the Pennsylvania campaign. The scarcity of coopers led millers to ship flour in almost any container they could find in the fall of 1776, using "all the old barrels in the country that [have] been lying by this seven years past," many of which were far from water-tight. As a result, much of the flour spoiled before reaching ports and by law could not be exported. This adversely affected both millers and export traders who were eager to reach lucrative markets abroad.[33]

Reports of the cooper crisis came from millers across the Lower Delaware Valley. In 1776 Thomas May, proprietor of Elk Forge and Mills, proclaimed: "I am much distressed in the milling business for want of a cooper." Another miller claimed that he could not send any flour to market "for want of casks."[34] The shortage of coopers limited flour supplies in the Lower Delaware Valley starting in 1776 by reducing the number of available containers to hold flour and contributed to flour scarcity through 1779, including the terrible winter at Valley Forge. Heretofore, the cooper crisis has been ignored as a contributing factor to production reduction during the American Revolution. Millers never complained about a lack of millhands during the war, suggesting that unskilled labor was much easier to replace in the community. Moreover,

evidence shows that the cooper crisis was one of the most traumatizing episodes of the war for the Lower Delaware Valley's grain economy.

As the war dragged on, production and transportation costs mounted and millers struggled to profit. To keep up with production costs and inflation, millers had to sell their flour high to avoid losing money. Freight costs steadily increased during the war. For example, the price of hauling a load of flour from Head of Elk to Christiana Bridge rose from £5 to £10 in the fall of 1778 alone. Because of high freight costs, miller Elijah Bolden calculated that his flour needed to be sold "at £3 per barrel or else I shall lose by it." However, the cooper crisis appears to have caused the greatest distress to millers during the war. When millers returned to business after the British pulled out of Philadelphia in the fall of 1778 the going rate for a newly made barrel was ten shillings, or ten times the pre-war price. Jonathan Booth calculated that millers lost over five shillings per cask, but added that in desperate times they were "glad to get them at any price." By the spring of 1779 millers "gave from twenty-five to thirty shillings per [barrel]," and "thank[ed] the coopers for letting [them] have them so cheap." Freight charges and barrel prices continued to rise through the end of the war. Under these circumstances it became increasingly difficult for millers to meet production costs.[35]

The reopening of West Indies trade started an economic recovery in 1780 that could not be fully realized by the Lower Delaware Valley's millers. As a result of the continuing competition over grain, farmers often raised the price of wheat so high that it exceeded the price of flour, making it unprofitable for millers to make flour. "I would recommend you," wrote John Thomas Ricketts to Levi Hollingsworth in May of 1782, "to not sell the rest of our flour if you even could at the present markets which will not pay us for the wheat." Following improved

harvests in 1780 and 1781, the region's mills may have been full of flour, but as one miller claimed in 1780 many were "heels over head in debt." By 1782 James Black simply said, "we have not one peny to rub on another."[36]

Milling was circumscribed not only by farmers' demands for cash and military requisitions, but also by state embargoes. From Congress's and the Continental army's point of view, the foreign West Indies trade presented an even more formidable opponent than the French military market. So, in order to secure basic food supplies, both Congress and the mid-Atlantic states passed laws forcing farmers and millers in the Lower Delaware Valley to support the war effort rather than export foodstuffs to the West Indies. To ensure that they could meet Congress' requisitions, the mid-Atlantic states passed embargoes against exporting foodstuffs. Pennsylvania, Delaware, and Maryland each established embargoes beginning in January of 1780 for a time of one month "or as long as necessary." As the laws expired, state governments often passed new laws during 1780 and 1781, reflecting the continuing draw of West Indies markets, which threatened to drain supplies away from the army.[37]

The on-again-off-again timing of the various state embargo laws presented grain traders with a number of challenges. When the Maryland embargo went back into affect in January of 1781 John Thomas Ricketts was one of many millers caught in a dilemma. He had purchased one thousand bushels of wheat from farmers on the Eastern Shore to grind in his mill in Delaware, but the wheat lay in Maryland and he was forbidden to take it across state lines. At the same time, several of the Brandywine millers were expecting wheat from Zebulon Hollingsworth but the five wagons had been turned around and sent back to his stores at Elkton. Embargoes regularly disrupted farmers', millers', and merchants' attempts to reach lucrative

West Indian island markets. States charged fines as high as £100 per bushel of wheat and £3 per barrel of flour. Enforcement was centered in Philadelphia, Baltimore, Wilmington, and important border towns such as Elkton, Christiana Bridge, and Chester.[38]

To avoid ruin some merchants and millers did break the law, risking vigilantes and steep fines. Although the volume of illegal trade cannot be quantified, enough scattered evidence remains to suggest that it was large. In August 1780, John Thomas Ricketts smuggled sixty-five barrels of flour aboard the sloop *Peterson and Berry* from Murderkill Creek to Philadelphia. He broke several laws in the process of making and shipping the flour. As he explained to Levi Hollingsworth, "we are obliged to run the wheat out of Maryland then run the flour out of this state as well as risk pirates." Millers and merchants in the Lower Delaware Valley responded to grain and flour embargoes by smuggling, just as they had done under Britain's Navigation laws during the colonial period. As millers smuggled flour so that it could be exported to the West Indies, they hid their flour from military purchasers. In the summer of 1780 an agent from the quartermaster department stopped at Alexander Porter Jr.'s mill and confiscated two horses, but a fast-acting Porter managed to keep a stash of flour "out of his sight." Two days later Porter secretly shipped the flour to Philadelphia. With West Indian markets open again millers were even less willing to do business with the Continental army.[39]

Overall, the Brandywine millers did better than most during the war. "Though grane sells high," wrote one disgruntled competitor in 1778, "the Brandywine millers keeps wheat up."[40] Maryland reportedly passed the one-month embargo in January 1780 in response to the Brandywine millers' agents who had raised wheat prices in Harford County to £42 per bushel. There is also evidence indicating that some of the Brandywine millers sold flour to the British in

New York.[41] Other evidence suggests that the Brandywine millers did not supply their share of state flour quotas. In the summer 1780 state representative Caesar Rodney went to Wilmington to "make the millers join the millers in the Lower countys to furnish the quotas of flour demanded from that state monthly."[42] Thomas Lea's accounts record a resurgence of business in 1780. That year he purchased over twenty thousand bushels of wheat, more than doubling his stock from the previous year. In 1781 and 1782 Lea expanded milling further, buying around fifty thousand bushels of wheat each year.[43] Unlike most of the region's millers, the Brandywine millers owned their own sloops and did not rely on factors to sell their flour. That meant they took greater risks in shipping flour during wartime but also earned greater rewards when shipments got through.

Before the American Revolution no major wars had been fought in the mid-Atlantic region. Used to their role as suppliers to distant fronts, the Lower Delaware Valley's grain community struggled to manage a war in their own backyard. Generally the war started out well, especially for merchants, but slipped between 1777 and 1779 when the war moved into the region. Only when the French and Spanish entered the war, thereby turning the American War for Independence into an imperial conflict, did most grain traders find their footing and their fortunes. The region's economic rebound depended on West Indies markets as well as the aggressive market savvy of farmers, millers, and merchants. What farmers, millers, and merchants discovered in the American Revolution was that an internal war brought almost as many problems as it did benefits. Not even the war's biggest winners emerged from the conflict unscathed.

The French Revolutionary & Napoleonic Wars

The American Revolution was oftimes fought in the Delaware Valley; the disruption of the grain economy could be personal, violent, and sustained. The French Revolutionary and Napoleonic Wars that convulsed Europe from 1793 to 1815 were, in contrast, distant conflicts that chiefly impacted trade, and even when the United States was drawn into a conflict with Great Britain in 1812, the fighting occurred away from the wheat farms of the Delaware Valley and the port of Philadelphia. The accelerating French Revolution led to pressure on the Low Countries, the execution of Louis XIV in January of 1793, and a French declaration of war against Great Britain in February. Britain fought the wars by trying to fashion continental alliances that could match French land forces; France fought the wars by trying to secure enough naval help to challenge British control of the seas. Through early 1796, the war had been fought to a stalemate -- Britain had protected its holdings in the Caribbean and India, but its continental allies had been forced to make peace and withdraw from the war. From that point on, while the British navy continued to hold the upper hand, the tide overall shifted toward France. Only the weather in the winter of 1796-97 stopped a French invasion of Great Britain. The French slipped an invasion fleet by the British and took Cairo; Napoleon (who became the French leader in 1799 and emperor in 1804) knocked Britain's chief ally, Austria, out of the war at Hohenlinden, and French pressure in 1801 excluded British shipping from Portugal. When peace ended the first round of hostilities (in 1801, although the Peace of Amiens wasn't finalized until early 1802), Great Britain had clearly lost.[44]

Britain used the peace to recover, and then declared war in May 1803. Initially the pattern was much the same as in the first round. Napoleon won a major victory over Austria and

Russia at Austerlitz in 1805, and defeated Russian and Prussian armies at Friedland in 1807. Later that year a French army occupied Lisbon. Britain, however, destroyed the French fleet at Trafalgar in 1805, and subsequently blocked Napoleon's efforts to bring the Spanish, Portuguese, and Russian fleets under French control. By August of 1808, after less than a year's occupation, the British had driven the French from Lisbon, and begun a five-year battle for the Iberian peninsula that, once Napoleon had been weakened by his disastrous invasion of Russia, would see Britain and her allies sweep French forces out of Spain and lead to an invasion of France. Britain would again seize wealthy Caribbean sugar islands from France and Spain, again suffer horrible losses from disease in doing so, and again give them up in peace negotiations to secure its continental European ambitions. America's brief entry into war with Great Britain would seem, at least to those in Europe, little more than a footnote to decades of fighting, and would come to conclusion just as the Treaty of Paris in November 1815 finally ended the Napoleonic Wars.[45]

The French Revolutionary and Napoleonic Wars provided American shippers with unprecedented opportunities and challenged them with enormous risks. On balance, opportunity trumped risk – American trade boomed and the grain trade led American exports.[46] In June and November 1793, Britain issued Orders in Council that justified their seizure of neutral shipping trading with France or the French West Indies, and promptly seized much of the American shipping in the Caribbean. The Jay Treaty of 1794 pulled Americans back from the brink of war with Great Britain, but only at the cost of increasingly bitter relations with France that led to an undeclared naval war in 1798-1800 (those antagonisms brought to an end as well by treaty in 1800).

When war between France and Great Britain resumed in 1803, Great Britain in a series of Orders in Council applied the "Rule of 1756" to place a stranglehold of French supply lines. The "Rule" stated that when a European nation (France) had not allowed trade with its colonies during peacetime it could not open that trade to neutral shipping while at war with Great Britain. The rule had justified the Caribbean seizures of American shipping in 1793, but British courts had upheld the right of (American) vessels to trade between the French West Indies and France if their voyage was "broken" by a stop at a United States port. In 1805, however, the British courts reversed themselves, and closed this loophole, putting much of America's most profitable commerce at risk. Congress struck back with the Non-Importation Act in 1806, prohibiting a long list of enumerated British imports; and Napoleon answered the British with the Berlin Decree, that proclaimed an (unenforceable) blockade of Great Britain. Both France and Great Britain spent 1807 trying to cripple their enemy with new trade restrictions. With American shipping at risk, and feelings against Great Britain running high (as Britain and the naval power to enforce its policies), President Jefferson pushed through Congress in late 1807 the Embargo Act, which virtually stopped all shipping with foreign nations. The act would stay in effect until early 1809, when it would be replaced by the Non-Intercourse Act, which stopped trade only with France and Great Britain (and allowed for that trade to be reopened as well if either nation agreed to stop violating neutral rights). Napoleon adroitly exploited the situation by telling the United States that he would repeal the Berlin and Milan decrees if the United States continued non-intercourse with Great Britain. President Madison authorized trade with France (and its colonies) and maintained the ban on British trade – in the year that followed before Britain

revoked its Orders in Council, relations between Great Britain and the United States would deteriorate to the point of war.[47]

The opportunities created by warfare for Lower Delaware Valley grain farmers were of three types: the impact of a harvest failure anywhere in Europe, as France and Great Britain experienced in 1795 and Great Britain in 1809, to take but two examples, was compounded because of the difficulty of securing overseas supplies. Second, as a neutral, however much abused in that role through 1812, the United States was even more critical than it might otherwise have been in supplying food to the Caribbean sugar islands. Finally, the provisioning of massive armies, especially during the last years of the wars in Iberia, created extraordinary chances to exploit trades that were already well established.[48]

When war broke out in Europe in 1793, the Lower Delaware Valley's grain community devised a simple plan: stay neutral and trade. Mid-Atlantic grain producers and traders met this new war armed with the experience they had gained from the Seven Years' War and the American Revolution. History proved that warring European empires made American produce "precious," and that "good policy" dictated that European powers suspend their restrictive commercial policies and open their ports to American commerce. Grain traders and flour producers expected this new war to raise prices, because past experiences had proved that when it came to feeding armies: "necessity knows no law."[49] Stephen Hollingsworth spoke for most merchants when he said, "If blood must be let, I hope it may be confined to their own quarter of the globe, and let America be industrious and aid the heated nations with provision as much as in us lays." Thomas Jefferson put it less prosaically when he summed it up: "Our object is to feed and theirs to fight, we have only to pray that their souldiers may eat a great deal." While at least

one merchant admitted that he regretted the war "as a friend of humanity," he also celebrated it in "the interest of the United States."[50] The American War for Independence had taught the grain community that their commercial success depended upon keeping the conflict at a distance. The Lower Delaware Valley's farmers, millers, and merchants spent the next two decades trying to do just that.

During the war European demand for American wheat and flour depended upon harvest conditions at home and the openness of their usual channels for grain. Total American wheat and flour exports fluctuated between two to three million bushels of wheat from 1794 and 1799, increased to five to six million bushels between 1800 and 1802, took a downward turn in 1803-1805 to three million bushels of wheat a year, jumped to six million in 1806, dropped to one million in 1807, gradually climbed back up to six million in the 1808-1812 period, and finally plummeted to under one million bushels of wheat exported in 1813.[51] Merchants gave the highest prices for flour in the mid-Atlantic region at the start of the war, averaging between $10 and $15 during 1794-1796. Flour prices were lowest, around $6, in 1798, 1802-1804, and 1808. The best years for selling flour overseas were 1795 and 1811.[52]

The mid-Atlantic grain economy passed through several phases between 1793 and 1815. The first phase of war was marked by brisk trade as demand for grain and flour skyrocketed. As always, in peace or war, the chief demand for mid-Atlantic flour came from the West Indies. When troops arrived in the islands in the spring of 1795, a miller noted that "the West Indies will want all we have to spare." In 1796 flour sales in the West Indies "exceeded every expectation" held by the Lower Delaware Valley's millers and merchants.[53] In Europe, France was the first to face a grain crisis and to look to America for food. Poor harvests in France from 1793 to 1795

opened French markets to American grain and flour. In June 1795 a cargo of flour sold in Bordeaux at $23 per barrel. One month later flour prices at Paris had risen to $40 per barrel and to $35 at most of the sea ports. With "no prospect of Peace," a miller observed, "the skippers expect to make their fortunes by it."[54] Harvest failure in England only improved the situation for mid-Atlantic grain traders. Many believed that Europe could not survive without mid-Atlantic grain and flour. "It is not necessary to resort to private information to shew how precious our produce is in England & France," explained two millers in 1795 for "the newspapers give sufficient proofs of this."[55]

The Jay Treaty helped to usher in a second, longer and more volatile, phase of the war, marked by more lows than highs, including an undeclared naval war with France, an interlude of peace in Europe, and a major embargo in America. From 1796 to 1808, the mid-Atlantic grain economy experienced more abrupt swings as American shipping became one of the main targets of imperial economic warfare. The French market was never as lucrative after 1795 because of declining relations between France and the United States, which escalated into a naval war in the Caribbean and ended with a new treaty in 1800, as well as changes taking place in Europe during the war. After 1800 Europe's grain imports decreased because its harvests improved, and through alliances and force Napoleon secured larger shares of Europe's wheat trade for France. In 1806 Napoleon swept across Germany and established a continental blockade against Britain. Prussia abandoned neutrality, allied with France, and closed its ports to Britain. Eastern Europe grain kept France's granaries well stocked from 1806 to 1813.[56]

Unlike with France, the grain trade did not decline along with relations between Britain and the United States. Napoleon's control of continental grain supplies made Britain dependent

on mid-Atlantic farmers for surpluses to its feed soldiers and civilians. While weather not war was the main culprit for crop failures in England, Napoleon's eastern alliance caused considerable disruption in the flow of grain to Britain. When these two conditions occurred simultaneously, mid-Atlantic grain traders prospered. Under normal circumstances, Britain acquired its wheat from two main sources: America and northern Europe. Prussia and the port of Danzig provided the most important market for British grain merchants. Between 1792 and 1798 four thousand ships entered London carrying Prussian grain. In times of scarcity the British government frequently offered bounties on Prussian wheat in particular. But shifting alliances after 1798 limited grain supplies from Prussia, and the French continental blockade cut them off entirely after 1806. Britain imported the greatest amount of grain and flour from the mid-Atlantic following harvest failures in 1800, 1801, 1807, and 1809 largely because they had no other choice.[57]

Thomas Jefferson and other political leaders saw the grain trade as their wartime trump card and decided to play it in 1807. They responded to the belligerent powers with an embargo, which shut down the American export trade for most of 1808. Although the Lower Delaware Valley's grain community objected to their loss of trade, initially they believed the embargo would be brief and effective. Many people envisioned that "dreadful scenes" would follow "from the multitudes which will be thrown out of bread" across Europe.[58] Such desperate conditions would force Britain and France to respect American trade. They were wrong. The American grain trade alone could never have brought the British and French governments to their knees, moreover, Jefferson enacted the embargo at a moment when the American grain

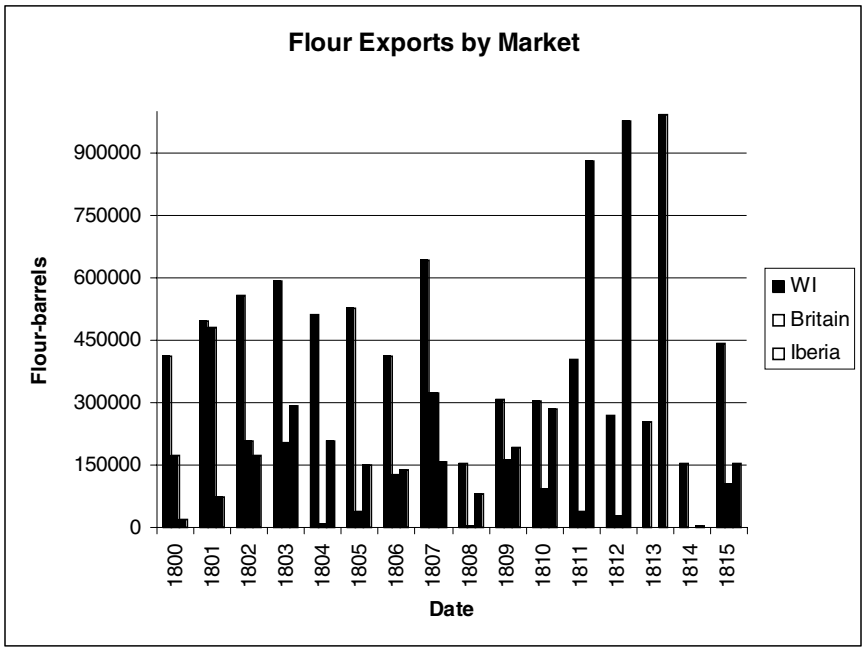
trade's influence was at a low point. The mid-Atlantic was overstocked with grain and flour and overseas demand was in decline.

The embargo limited commerce, but never stopped it entirely. Sixty percent of the total amount of flour exported in 1808 ended up in the West Indies. Another thirty percent found its way to southern Europe. Scarcity and high prices during the embargo encouraged traders to break the law. Vessels sailed for the Caribbean illegally, claiming that they had been blown off course en route to Boston or Charleston. Although a few of the six thousand vessels supposedly caught in the winds ended up in Europe, most of them found themselves in the Caribbean.[59] At the same time flour was selling in the mid-Atlantic at $4.50 a barrel, the lowest price in decades, it sold in the West Indies for as much as $40 a barrel. Watching trade continue to prosper in the Lower Delaware Valley, a grain trader quipped, "So much for TJ & the Embargo."[60]

The grain trade hit its highest peak in the final phase of the war as a result of the Iberian campaign waged between 1808 and 1813. Although both France and Britain imported American grain because of harvest failures, overall Iberia—including Spain, Portugal, the Canary Islands, Madeira, and Azores—provided more consistent markets. Before the invasion, a Lisbon merchant instructed his Philadelphia correspondents that "speculations in breadstuffs from your country will be eminently successful, not a bushel of grain nor a barrel of flour can be received here but from America & there will be no bounds to the advance in our prices."[61] When the imperial powers invaded the region in 1808, demand reached unprecedented levels. "The cultivation of the Country [has] been almost entirely neglected in consequence of its invasion," explained William Jarvis.[62] Prices for flour in Lisbon rose from $15 per barrel to $18 in 1810, while they stayed at $8 in America, offering merchants an opportunity to profit. The situation

continued much the same for the next few years. In 1811 Iberian exports represented sixty percent of the total flour exports for that year.[63] Of the 693 ships that entered Lisbon during the second half of 1812, 235 of them came from the mid-Atlantic with grain and flour.[64] Even more Iberian business was thrown in their direction in 1813 because of the failure of Egypt's grain harvest and "that the wheat from the Black Sea had been stopped for the use of Constantinople."[65] The value of the grain trade to Iberia for the year 1813 was around fifteen million dollars.[66]

Table 2



Source: Timothy Pitkin, *A Statistical View of Commerce* (reprint: NY, 1967), 125-126.

The War of 1812 did not stop the flour trade to southern Europe, because the American government recognized how important it was to the nation's war effort. Facing a strong enemy

in the British, Jefferson spoke for most American political leaders and merchants when he said, "I think we had better feed them there for pay, than fight them here for nothing."[67] As long as the war continued in Europe and Britain had a large army to feed, America had a chance. Jefferson saw an American victory orchestrated not by battlefield tactics but by commercial maneuvers. At the same time that continuing the grain trade gave Americans leverage over their enemy, it also helped drum up support for the war at home. Memories of the embargo and its commercial backlash must have figured strongly in Jefferson's advice to incoming President Madison "To furnish markets for our produce say indeed for our flour."[68]

For the most part, profitable markets to Europe remained open to the Lower Delaware Valley's grain producers and traders during the French Revolutionary and Napoleonic Wars. More than any other group perhaps, millers took advantage of the situation. With the war a world away, millers were free to go about their business in stark contrast to the dark days of the American Revolution. Although millers occasionally faced cask shortages, probably because laborers were drawn into the shipbuilding industry, there would be no cask crisis this time around. Such favorable wartime conditions encouraged millers to risk the expense of improving their mills or constructing new ones. In this case, technological innovation cannot be properly understood outside of this Atlantic world context. In particular, millers' adoption of Oliver Evans' "automatic flour mill" coincided with booming flour markets brought on in 1789 by harvest failures across Europe in general and the outbreak of war in particular.[69]

Evans' automatic mill did not change how flour was produced, but rather how the grain was moved from one process to the next inside the mill by the introduction of a series of new machines. The automatic mill included three key machines—the elevator, the hopper boy, and

the conveyor. The elevator replaced one of the most strenuous tasks in a mill, raising the grain to the upper-story for grinding. The elevator consisted of a circular leather belt set on pulleys, reaching from the ground floor to the loft, fitted with buckets and enclosed by a wooden shaft to cut down on waste and dust. As the buckets reached the top of the lift, they turned upside-down, emptying their grain into a chute that led to the next operation.[70] Evans came up with the hopper boy, which received ground meal from the elevator and spread the flour in a circle on the granary floor to cool and dry. The machine consisted of a vertical shaft six feet tall with two horizontal arms at the bottom, each sweeping a seven-foot radius, and two balance arms at the top, each four feet long. A hole in the floor allowed the cool flour to drop into the bolter below.[71] The other parts of the automatic mill consisted of several conveyors that moved the grain throughout the mill. The aerating effect of the conveyor and hopper boy reduced the drying time from twelve to four hours, and faster dried flour had better keeping quality.[72]

In addition to refitting older mills, mid-Atlantic millers built new mills that dwarfed previous colonial enterprises during the Napoleonic Wars. The total cost of a state-of-the-art mill was $8,000, including the mill seat purchase, construction, and start-up capital for wheat supplies and services. This was over five times greater than building and outfitting a ship, and just slightly less than constructing a textile mill with the most up-to-date technology, which cost $10,000 at that time. The Ellicotts' Upper Mills in Baltimore were among the era's most impressive new enterprises. The buildings stood five stories tall, the three lower floors were built of stone and the upper two floors out of brick. Situated only one hundred twenty feet apart, each mill had "four pair of seven feet grindstones, three waterwheels, bolting works, elevators, hopper boys, conveyors, fans, screens, packing jacks, and machinery for cleaning wheat," which

surprised visitors by operating "with little noise and clattering." Each mill had a grinding capacity of one hundred fifty thousand bushels of wheat annually, and together could potentially produce more flour than the twelve Brandywine mills combined.[73] Although millers could not know how long war would last, the construction of such large-scale enterprises prove that mid-Atlantic millers (along with merchants and farmers) believed that overseas demand for grain and flour would continue to grow.

Conclusions

So what of the ramifications of war in/across the Atlantic on the local economy of the mid-Atlantic? What we offer here are a few preliminary conclusions that will hopefully spark a lively discussion in Philadelphia.

(1) Overall, war disturbed but did not disrupt the grain economy between 1750 and 1815. In fact, more often than not, war encouraged economic development. Doerflinger made a similar argument for Philadelphia's commercial community, and it appears to hold for the grain economy as a whole. As Doerflinger argued, "Thus the shattering experience of war, rather than retarding the process of economic development in the Delaware Valley, actually accelerated it."[74] For the grain economy, this meant expanded grain production, improved transportation networks, increased commercial specialization, and technological innovations.

(2) The American Revolution broke the region's wartime pattern, and is distinguished by its peculiar destructiveness.[75] The War for Independence began on a distant field in New England as many eighteenth-century colonial American wars had. But two years later it took a truly revolutionary turn by bringing for the first time a major war to the farmers, millers, and

merchants living in the Lower Delaware Valley. Instead of supplying troops and goods to a far-off front, residents found themselves face-to-face with the enemy. The change was dramatic. They could not do business as usual, meaning the standard set by previous colonial wars, especially the Seven Years' War. This difference made the Revolution all the more shocking to the mid-Atlantic producers, and made them more fearful of internal warfare in the future.

(3) War was not the only force, nor perhaps the most disruptive, affecting the grain economy. It is difficult to say which stimulated economic growth more, European harvest failures (largely weather-related) or imperial warfare. Environmental conditions such as climate are too often ignored or downplayed in analyses of the eighteenth-century Atlantic world economy. Farmers, millers, and merchants in the mid-Atlantic understood that prices for grain and flour were determined by a combination of crop and trade conditions. The most dramatic of which were weather and war. While climate largely dictated harvest outcomes, war could significantly determine commercial operations in the Atlantic world. Both forces—weather and war—were random, destructive, and ultimately, out of their control. We often think of the eighteenth century as an age of warfare, but it was also a period of severe weather. Although not as bitterly cold as either the seventeenth or nineteenth centuries, the eighteenth-century climate fluctuated more violently between hot and cold, with devastating effects on agriculture. On the topic of Pennsylvania's weather, Benjamin Rush said: "We have no two successive years alike-there is but one steady trait, and that is, it is uniformly variable."[76] It may be impossible to determine which had the greatest impact on the mid-Atlantic grain economy during the eighteenth century—weather or war—but it is beyond doubt that these two forces (natural and man-made) shaped the lives of people living in the Lower Delaware Valley as well as the

region's economic development during the "long eighteenth century." A direct comparison of the grain economy's responses to war and weather would yield telling results.

So, where are we headed? A survey of current scholarship reveals that most historians when investigating the economic impact of war have focused on a specific war (usually the American Revolution) and a particular group of people (usually merchants). There has been little effort to examine eighteenth-century wars in a comparative perspective, thus minimizing the dynamic relationship between wars.[77] The predominant focus on a single group of actors such as merchants has also skewed our understanding. We are interested in figuring out how farmers, millers, and merchants responded to wartime conditions, and in particular, if they learned how to profit in the more risky economic environment. By factoring the learning curve among farmers, millers, and merchants, we will be able to show if or how they modified their behavior during war over time. This may be our most significant scholarly contribution. While we are only at the beginning stages, it appears that merchants, millers, and farmers in the Lower Delaware Valley were more market savvy and war-wise than they have been given credit for.

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[1] H.V. Bower, *War and British Society, 1688-1815* (Cambridge, England: Cambridge University Press, 1998).

[2] John Brewer, *The Sinews of Power: War, Money and the English State, 1688-1783* (New York: Knopf, 1989); Linda Colley, *Britons: Forging the Nation,* 1707-1837 (New Haven: Yale University Press, 1992). The paraphrase comes from Bower, *War and British Society*, 80.

[3] Most of this scholarship has focused on the American Revolution. The following are a few of the recent examinations of America's Revolutionary War economy. On the impact of the British Navy on the American economy, see Richard Buel, Jr., *In Irons: Britain`s Naval Supremacy and the American Revolutionary Economy* (New Haven: Yale University Press, 1998). On merchants' wartime experience, see Thomas M. Doerflinger, *A Vigorous Spirit of Enterprise: Merchants and Economic Development in Revolutionary Philadelphia* (New York: Norton, 1987), especially Part II. On the debate over the rise of capitalism, see James Henretta, "The War for Independence and American Economic Development," in Ronald Hoffman, John J. McCusker, Russell R. Menard, and Peter J. Albert, eds., *The Economy of Early America: The Revolutionary Period, 1763-1790* (Charlottesville: University of Virginia Press, 1988), 45-63. For a study of the Revolution's impact on one Chesapeake county, see Jean B. Lee, *The Price of Nationhood: The American Revolution in Charles County* (New York: Norton, 1994).

[4] This paper is the basis of an article, in which we will explore three interrelated questions about the short-term consequences of war on the grain economy: 1) How did war affect the marketing and price of wheat, corn, and

flour? 2) How did farmers, millers, and merchants respond to wartime conditions? Were there winners and losers? Did some learn more quickly than others how to profit in a more risky environment? 3) Is there evidence that the destructiveness of war significantly disrupted economic life in the region?

[5] Fred Anderson, *Crucible of War: The Seven Years' War and the Fate of Empire in British North America, 1754-1766* (New York: Knopf, 2000).

[6] Gary B. Nash, *The Urban Crucible: Social Change, Political Consciousness, and the Origins of the American Revolution* (Cambridge, MA: Harvard University Press, 1979), 233-263.

[7] Anne Bezanson, Robert D. Gray, and Miriam Hussey, *Prices in Colonial Pennsylvania* (Philadelphia: University of Pennsylvania Press, 1935), 35-41, 394-406, 422. Bezanson's prices are wholesale prices drawn from Philadelphia newspapers and supplemented by prices from merchant's account books. During this period, these prices are not the same as but correlate well annually with local farm prices.

[8] Alan Kulikoff, *From British Peasants to Colonial American Farmers* (Chapel Hill: University of North Carolina Press, 2000), 256, 261.

[9] Kulikoff, *From British Peasants to Colonial American Farmers*, 261, provides the statement about wages and prices, which can be readily confirmed in Chester County account books. Kulikoff's chapter makes it clear that his analysis is preliminary and he is engaged in a book-length study of the impact of the war in rural America. Much of the most devastating market disruptions he chronicles here happens to the tobacco and rice planters of the South.

[10] The story of the millstone removal is recounted in a number of places, see Peter C. Welsh, "The Brandywine Mills: A Chronicle of an Industry, 1762-1816," *Delaware History* 7 (1957), 21-22. Tatnall quoted in Carole Hoffecker, *Brandywine Village* (Wilmington: Old Brandywine Village Inc., 1974), 28. For an account of Philadelphia during the British occupation, see Willard O. Mishoff, "Business in Philadelphia during the British Occupation, 1777-1778," *Pennsylvania Magazine of History and Biography* 61 (1937): 165-181.

[11] The main argument of Buel's recent study, *In Irons*, is that the British navy handicapped American commerce more than any other factor during the War for Independence.

[12] Doerflinger, *A Vigorous Spirit of Enterprise,* 210-212; Kulikoff, *From British Peasants to Colonial American Farmers*, 56-257, 267.

[13] On troop movements, see Zebulon Hollingsworth to Levi Hollingsworth (hereafter LH), 29 April 1780; 1 May 1780; 2 May 1780; 10 May 1780; 27 March 1781; 10 April 1781; 10 September 1781; 29 December 1781; Solomon Maxwell to LH, 1 May 1780; 13 May 1780, Hollingsworth Papers (hereafter HP), Historical Society of Pennsylvania (hereafter HSP), Philadelphia, Pennsylvania.

[14] On harvest conditions, see Henry Hollingsworth to LH, 12 July 1780; 12 July 1781; James Pearce to LH, 2 July 1781; Jesse Hollingsworth to LH, 19 August 1780; and Vincent Gilpin to LH, 19 July 1781, HP.

[15] Robert Morris quoted in Doerflinger, *A Vigorous Spirit of Enterprise*, 211-212.

[16] Peggy K. Liss, *Atlantic Empires: The Network of Trade and Revolution, 1713-1826* (Baltimore: Johns Hopkins University Press, 1983), 78-79; Allan J. Kuethe, *Cuba, 1753-1815: Crown, Military, and Society* (Knoxville, Tenn.: University of Tennessee Press, 1986), 53-67; Buel, *In Irons*, 249; Charles B. Kuhlmann, *The Development of the Flour-Milling Industry in the United States* (Boston: Houghton Miflin, 1929), 39.

[17] Buel, *In Irons*, 180. For example, Thomas & Samuel Hollingsworth to LH, 25 November 1780, HP.

[18] This discussion is based on Brooke Hunter, "Rage for Grain: Flour Milling in the Mid-Atlantic, 1750-1815," (Ph.D diss.: University of Delaware, 2001), chapter 2. For similar breakdowns of the Revolutionary economy in the region, see Doerflinger, *A Vigorous Spirit of Enterprise*, 207-212. Doerflinger isolated the occupation of Philadelphia as a fourth stage. Buel also followed a similar pattern in *In Irons.*

[19] Caleb Ricketts to LH, 12 October 1778, HP.

[20] Bezanson, "Inflation and Controls," 5, 10; *Pennsylvania Gazette*, 20 March 1776; 12 June 1776. See also, Richard B. Sheridan, "The Crisis of Slave Subsistence and the British West Indies during and after the American Revolution," *William and Mary Quarterly* 33 (1976), 618-624. On successful Philadelphia merchants like Robert Morris, see Doerflinger, *A Vigorous Spirit of Enterprise*, 212-218, 236-242.

[21] Thomas Johnston to LH, 14 May 1779, HP.

[22] Hollingsworth filled a contract in the summer of 1782, see Zebulon Hollingsworth to LH, 22 June 1782; William Ferguson to LH, 22 June 1782; Hollingsworth & Loney to LH, 22 June 1782; Jonathan Booth to LH, 22 June 1782; William Ferguson to LH, 24 June 1782; Zebulon Hollingsworth to LH, 24 June 1782; William Ferguson to LH, 28 June 1782; Solomon Maxwell to LH, 1 July 1782; William Ferguson to LH, 2 July 1782; Thomas & Samuel Hollingsworth to LH, 3 July 1782; William Ferguson to LH, 6 July 1782; William Ferguson to LH, 8 July 1782; William Ferguson to LH, 9 July 1782; William Ferguson to LH, 11 July 1782; Henry Hollingsworth to LH, 11 July 1782; William Ferguson to LH, 13 July 1782; William Ferguson to LH, 20 July 1782, HP.

[23] On Duck Creek, see Solomon Maxwell to LH, 7 December 1778; 13 February 1779. On Christiana Bridge, see Solomon Maxwell to LH, 8 September 1780; 1 March 1782; 22 May 1782, HP.

[24] Buel, *In Irons*, 53-76; 186; Kulikoff, *From British Peasants to Colonial American Farmers*, 258.

[25] Solomon Maxwell to LH, 12 July 1782. On competition for French contracts, see also Solomon Maxwell to LH, 27 February 1782; 3 March 1782; 9 March 1782; 23 March 1782; 21 August 1782; 7 June 1782, Solomon Maxwell to LH, 18 October 1783, HP.

[26] Samuel Hollingsworth to Stephen Hollingsworth, 3 June 1779; Solomon Maxwell to LH, 19 July 1779; 27 July 1779, HP. See also Steven Rosswurm, *Arms, Country, and Class: The Philadelphia Militia and the "Lower Sort" during the American Revolution* (New Brunswick: Rutgers University Press, 1987), 182-183.

[27] Amos Alexander to LH, 31 August 1778, HP.

[28] Samuel Patterson to LH, 19 April 1777, HP.

[29] Doerflinger, *A Vigorous Spirit of Enterprise*, 167, 180-185, 212-223.

[30] Thomas Lea Mills Daybook, 1775-1783 (hereafter LMDB), Historical Society of Delaware (hereafter HSD), Wilmington, Delaware. Buel also used Lea's accounts, see *In Irons*, 16-18, 257-262. Lea's daybook provides a rare look into the operations of a merchant mill during the Revolutionary War.

[31] Thomas May to LH, 22 March 1781; John Simonton to LH, 16 July 1778; James Black to LH, 21 October 1778; Henry Hollingsworth to LH, 16 September 1778, HP.

[32] Samuel Patterson to LH, 19 April 1777; Thomas Gilpin to LH, 23 November 1776; John Simonton to LH, 8 May 1777, HP.

[33] Jonathan Booth to LH, 16 November 1776, HP.

[34] Thomas May to LH, 14 October 1776; John Simonton to LH, 5 October 1776; George Ford to Thomas Hollingsworth (hereafter TH), 16 Mar 1776; Jonathan Booth to LH, 16 November 1776; Jonathan Booth to TH, 6 August 1776; Zebulon Hollingsworth to LH, 1 April 1777.

[35] Jonathan Booth to LH, 8 October 1778; Elijah Boldin to LH, 25 August 1778; Jonathan Booth to LH, 6 October 1778; John Thomas Ricketts to LH, 2 May 1779, HP.

[36] John Thomas Ricketts to LH, 31 May 1782; Thomas May to LH, 12 May 1780; John Thomas Ricketts to LH, 5 July 1782; James Black to LH, 18 May 1782, HP.

[37] On Maryland's laws, see John Rawlings to LH, 15 January 1780; Thomas Hollingsworth to LH, 20 January 1780; 27 January 1780; Henry Hollingsworth to LH, 20 February 1780; Samuel Hollingsworth to LH, 24 June 1780 (renewed); John Rawlings to LH, 22 July 1780; Joseph Gilpin to LH, 7 August 1780 (repealed); John Thomas Ricketts to LH, 2 January 1781 (renewed); John Barnaby to LH, 28 January 1781 (expired); William Henry to LH, 25 February 1781 (renewed); Thomas May to LH, 19 March 1781 (expired). On Delaware's laws, see Jonathan Booth to LH, 14 September 1780 (effective); Jonathan Rumford to LH, 17 October 1780 (expired); John Stockton to LH, 25 May 1781 (effective), HP. Also, Claudia L. Bushman, Harold B. Hancock, and Elizabeth Moyne Homsey, eds., *Proceedings of the Assembly of the Lower Counties on the Delaware, 1770-1776; of the Constitutional Convention of 1776; and of the House of Assembly of the Delaware State, 1776-1781* (Newark, Del.: University of Delaware Press, 1986). See also Buel, *In Irons*, 143-147, 183-192.

[38] John Thomas Ricketts to LH, 2 January 1781; Zebulon Hollingsworth to LH, 28 December 1780 (seizure); Zebulon Hollingsworth to LH, 28 December 1780 (fines); John Barnaby to LH, 28 December 1780, HP.

[39] On Booth, see Zebulon Hollingsworth to LH, 12 March 1781 and John Barnaby to LH, 24 March 1781; John Rawlings to LH, 15 April 1780; John Thomas Ricketts to LH, 1 August 1780; Alexander Porter Jr. to LH, 13 July 1780, HP.

[40] Jonathan Booth to LH, 18 October 1778, HP.

[41] Zebulon Hollingsworth to LH, 28 December 1780, HP.

[42] John Rawlings to LH, 2 August 1780, HP.

[43] See entries on 15 January 1781; 20 January 1781; 15 January 1782; 18 January 1782; 18 August 1782; 17 January 1783, LMDB. Also see, Buel, *In Irons*, 17, 258-262.

[44] Ian R. Christie, *Wars and Revolutions: Britain, 1760-1815* (Cambridge, MA: Harvard University Press, 1982). 215-256.

[45] Christie, *Wars and Revolutions*, 257-280, 306-326.

[46] Curtis P. Nettles, *The Emergence of a National Economy, 1775-1815* (White Plains, NY: M.E. Sharpe, 1962), 221-238, 324.

[47] This detailed but still quite incomplete recounting of the commercial polices facing Philadelphia shippers has skipped over many of the nuances of legislation and proclamations, and left out such acts as Macon's Bill No. 2 that extended the non-intercourse policy. These policies are recounted in numerous sources, but can be found listed with unusual clarity in Richard B. Morris, *Encyclopedia of American History* (N.Y., Harper & Brothers, 1953), 125-141; Nettles, *Emergence of a National Economy,* 324-331.

[48] W. Freeman Galpin, *The Grain Supply of England During the Napoleonic Period* (New York: Macmillan Company, 1925), 124-148; G. Terry Sharrer, "Flour Milling and the Growth of Baltimore, 1783-1830," (Ph.D. diss., University of Maryland, 1975), 119-145; Douglass C. North, *The Economic Growth of the United States, 1790-1860* (New York: W. W. Norton, 1966), 36-45; Geoffrey Gilbert, "The Role of Breadstuffs in American Trade, 1770-1790," *Explorations in Economic History* 14 (1977): 378-387.

[49] Rudolph & Briscoe to LH, 30 December 1795; John Gilpin to LH, 26 September 1795, HP.

[50] Stephen Hollingsworth to LH, 24 May 1803, HP. Jefferson is quoted in Louis M. Sears, *Jefferson and the Embargo* (Durham: Duke University Press, 1927), 16-17. Thomas & Samuel Hollingsworth to LH, 5 July 1803; Joseph Barnes to LH, 2 June 1803, HP.

[51] Thomas C. Cochran, ed., *The New American State Papers, 1789-1860* (Wilmington: Scholarly Resources, 1972), vol. 1, 31, 118, 315, 354, 374, 397, 417; vol. 2, 26, 57, 97, 129, 190, 279, 305; vol. 3, 24, 35, 109, 147, 164, 252, 283, 317.

[52] This discussion is based on Hunter, "Rage for Grain," chapter 6. Prices were derived from Levi Hollingsworth Correspondence, HP; Timothy Pitkin, *A Statistical View of the Commerce of the United States* (reprint: NY, 1967), Table II, p. 126. Pitkin's figures were used for the years 1805-1811.

[53] Herman Stump to LH, 12 March 1795; Amos Loney to LH, 8 September 1796, HP.

[54] Thomas & Samuel Hollingsworth to LH, 16 June 1795; Herman Stump to LH, 20 July 1795, HP.

[55] Rudolph & Briscoe to LH, 30 December 1795, HP.

[56] François Crouzet, "Wars, Blockade, and Economic Change in Europe, 1792-1815," *Journal of Economic History* 24 (1964), 567-568. Also, Galpin, *Grain Supply*, 126-140.

[57] Timothy Pitkin, *A Statistical View of the Commerce of the United States* (reprint: NY, 1967), 126. Also, Galpin, *Grain Supply*, 124-130.

[58] John Odgen to LH, 27 December 1807, HP.

[59] On the impact of the embargo on the grain trade, see North, *Economic Growth*, 55-58; Sharrer, "Flour Milling and the Growth of Baltimore," 134-139; Galpin, *Grain Supply*, 144-146.

[60] Levi Hollingsworth Jr. to LH, 14 May 1808; Robert Hollingsworth to LH, 30 June 1808; 7 September 1808; David Nivin to LH, 8 October 1808, HP.

[61] Pitkin, *A Statistical View of Commerce*, 92-93. Jacob Dohrman & Co. to LH, 16 September 1807;14 October 1807, HP. On Spanish trade, see Javier Cuenca Esteban, "Trends and Cycles in U.S. Trade with Spain and the Spanish Empire, 1790-1819," *Journal of Economic History* 44 (1984), 521-528.

[62] William Jarvis & Co. to LH, 1 June 1810; 6 June 1810; 26 June 1810; 30 June 1810; 1 September 1810; 20 September 1810, HP.

[63] Pitkin, *A Statistical View of Commerce,* 121.

[64] W. Freeman Galpin, "The American Grain Trade to the Spanish Peninsula, 1810-1814," *American Historical Review* 28 (1922), 30, fn. 26.

[65] Circular dated 27 April 1813, Levi Hollingsworth Circulars, 1812-1815, (no. 276), HP.

[66] Pitkin, *A Statistical View of Commerce*, 93.

[67] Quoted in Sharrer, "Flour Milling and the Growth of Baltimore," 142.

[68] Letter to President Madison, 29 June 1812, in *The Writings of Thomas Jefferson*, edited by Paul Leicester Ford. (New York: G. P. Putnam's Son, 1892-1899), vol. 13:173.

[69] The definitive works on Evans are: Grenville and Dorothy Bathe, *Oliver Evans: A Chronicle of Early American Engineering* (Philadelphia: The Historical Society of Pennsylvania, 1935); Eugene S. Ferguson, *Oliver Evans: Inventive Genius of the American Industrial Revolution* (Greenville, Del.: Eleutherian Mills-Hagley Foundation, Inc., 1980). While Ferguson's portrait is much more even-handed than the Bathe's neither book attempts to measure Evans' impact on milling.

[70] Evans, *Mill-Wright Guide*, 204, 218-222. Also, Sharrer, "Flour Milling and the Growth of Baltimore," 72-83.

[71] Ferguson, *Oliver Evans*, 19-21.

[72] Ferguson, *Oliver Evans*, 25-26; Sharrer, "Flour Milling and the Growth of Baltimore," 74.

[73] John McGrain, *Grist Mills in Baltimore County, Maryland* (typescript: Maryland Historical Society, 1980), 7; Sharrer, "Flour Milling and the Growth of Baltimore," 85-86.

[74] Doerflinger, *A Vigorous Spirit of Enterprise*, 197-199. He highlights the following innovations: commercial banking, securities markets, commerce with continental Europe, tobacco trade, and land speculation. The quote is from p. 197.

[75] Other historians have reached similar conclusions about the Revolutionary War. For example, see Doerflinger, *A Vigorous Spirit of Enterprise,* 199-207; John McCusker and Russell Menard, *The Economy of British America, 1607-1789* (Chapel Hill: University of North Carolina Press, 1985), 364-366.

[76] The eighteenth century came near the end of the "Little Ice Age." For a fascinating account of this climatic era, see Brian Fagan, *The Little Ice Age: How Climate Made History, 1300-1850* (New York: Basic Books, 2000). Rush is quoted in Ben Gelber, *The Pennsylvania Weather Book* (New Brunswick: Rutgers University Press, 2002), 20.

[77] John McCusker and Russell Menard called for a "close study of the relationship between warfare and the performance of the American economy during the colonial and Revolutionary periods." Their call has rung unanswered. They suggested that "the best perspective to view the question of the economic impact of the American Revolution is as part of the 'Second Hundred Years' War (1689-1815)." See, McCusker and Menard, *Economy of British America,* 365-366. We agree and hope to follow their lead.