# Globalization and Mental Distress*

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**Abstract**

We study the effects of import competition on workers' mental distress, using unique longitudinal data on mental health for British residents, coupled with measures of import competition in more than 100 industries over 1995-2007. We find that import competition shocks have a large negative impact on individual mental health. Following a one standard deviation increase in trade exposure, a worker would need a yearly monetary compensation of £300 to make up for the ensuing utility loss, corresponding to a total annual compensation of £6.8 billion across all workers (0.5% of UK GDP). Using quantile regressions, we find import competition shocks to have larger effects on the right tail of the mental distress distribution, thereby increasing inequality in mental health not only across but also within industries. Using detailed data on demographics and job characteristics, we show that this is consistent with import competition shocks disproportionately hitting specific groups of workers in an industry, such as the youngest, those with either no or a large family, with a poor financial condition, with a short job tenure, or with a blue-collar job. We find the effects of import competition shocks to occur through a complex set of mechanisms. These include observable labor market outcomes such as higher likelihood of job displacement and lower wage growth, but also reduced job satisfaction and gloomier expectations about future career progression and financial perspectives. Finally, using information on family ties, we find that import competition shocks spill over to other members of the family. In particular, paternal trade exposure reduces investment in children and worsens their self-esteem and life satisfaction.

**JEL codes:** F1.
**Keywords**: Mental health; import competition; individual-level panel data.

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# 1 Introduction

Globalization and trade integration can bring about significant improvements in countries' welfare (see, e.g., Costinot and Rodríguez-Clare, 2018, and Feenstra, 2018, for a recent discussion). As a case in point, the two decades preceding the Great Recession—and the associated trade collapse—have seen a rapid expansion in trade participation for many developed countries, coupled with substantial improvements in their living standards. Yet, the same period has witnessed an unprecedented diffusion of anti-globalization sentiments, which have rapidly pervaded several industrialized economies, fueling the affirmation of nationalist parties and putting trade integration under fire.[1] The magnitude of this phenomenon, its pervasiveness in society, and the fact that it has emerged during a phase of sustained economic expansion, suggest that trade integration may have produced distributional effects that go beyond the standard adjustments in earnings and employment faced by specific groups of workers after a trade shock. In this paper, we shed light on this issue by documenting the widespread effects of import competition on workers' mental distress.

A rapidly developing literature highlights a number of novel non-pecuniary effects of import competition, including increases in local area crime (Che and Xu, 2016; Dix-Carneiro et al., 2018; Deiana, 2018), household debt (Barrot et al., 2017), and job-related injuries (McManus and Schaur, 2016), as well as reductions in the provision of local public goods (Feler and Senses, 2017), and in marriage and fertility (Autor et al., 2018; Keller and Utar, 2017). A few independent working papers, contemporaneous to our work, focus on import competition shocks at the county level in the US and report that more trade exposed localities also experience a relative worsening in the average health conditions of their resident population.[2] Interestingly, among the various health indicators analyzed in these studies, trade exposed localities also exhibit higher mortality rates due to suicides and drug overdoses (Adda and Fawaz, 2017; Lang et al., 2017; Pierce and Schott, 2017); more hospital admissions due to alcohol abuse (Adda and Fawaz, 2017); and higher average rates of mental morbidity in the population, as computed from answers to cross-sectional telephone surveys about self-assessed health (Adda and Fawaz, 2017; Lang et al., 2017). An interpretation of this evidence is that the exposure to rising import competition could lead to a deterioration in the mental health of individual workers over time. So far, however, there is no systematic evidence on this effect, as the emerging literature on import competition and health is based either on aggregate data at the local level or on cross-sectional surveys.

In this paper, we draw on extremely detailed, longitudinal, data on UK residents (sourced

[1] For instance, statistics from the Eurobarometer show that the share of EU residents declaring to be in favor of globalization has dropped from 63 to 42% between 2003 and 2006, while the share of people declaring to be against globalization has soared from 29 to 44%. The evidence is similar across countries. In the UK, the country that we focus on in this paper, the share of people in favor (against) globalization has changed from 60% (27%) in 2003 to 47% (34%) in 2006. See, in particular, Autor, Dorn, Hanson and Majlesi (2016), Che et al. (2016), and Colantone and Stanig (2018*a*,*b*) on how trade has shaped the recent changes in political attitudes, influencing the emergence of nationalist and extremist parties in developed countries.

[2] In this paper, we follow the convention and use the terms import competition shocks and trade exposure interchangeably. See Colantone et al. (2015) for the first version of this paper.

from the British Household Panel Survey, henceforth BHPS) to provide the first comprehensive analysis of how import competition shocks affect the mental health of individual workers over time. We make four main contributions. First, the possibility to observe a clinically valid measure of mental distress for each person over many years enables us to identify the individual-level responses of mental distress to trade exposure, and to provide a precise quantification of the economic magnitude of the effects. Second, the rich information on demographics and job characteristics contained in our data allows us to explore the implications of import competition shocks for different groups of workers, providing the first assessment of how trade exposure shapes the entire distribution of subjective wellbeing across exposed workers. Third, we are able to shed light on the individual-level mechanisms underlying the effects of import competition shocks. We unveil that some of these mechanisms are at play in a broad population of workers, which is not limited to those whose observable labor market conditions change after the trade shock. Finally, the possibility to link each individual to the other members of her family allows us to study how the effects of trade exposure propagate to a workers' spouse and children, providing the first evidence of intra-household spillovers.

Our main measure of mental distress is the Generalized Health Questionnaire indicator (GHQ-12), an index that is widely used by clinicians for detecting psychiatric illness and extensively employed in academic research on mental health.[3] Using the information on each worker's industry of employment contained in the BHPS, we match the individual-level data on GHQ-12 with measures of import competition in 119 industries covering the entire UK economy. The period of analysis starts in 1995 and ends in 2007, the year before the onset of the Great Recession.[4]

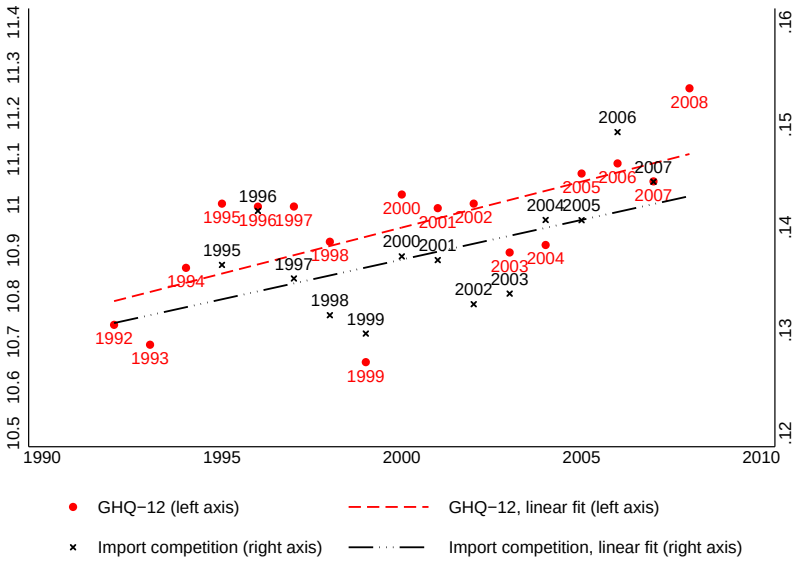
Over the period of analysis, the UK has experienced a marked increase both in the incidence of mental distress and in import competition. The number of people suffering from mental health problems has reached 8 million in 2007, and the number of individuals using public mental health services has risen by 20% between 2003 and 2007.[5] At the same time, trade integration has proceeded rapidly, entailing a sharp increase in import competition. Between 1995 and 2007, a period of rapid economic expansion characterized by a 34% growth in real per-

[3]See, e.g., Clark and Oswald (1994), Clark (2003), Oswald and Powdthavee (2008), MacKerron (2012), and Dustmann and Fasani (2016) for studies using GHQ-12 in the economic literature. See also Goldberg (1978), Easton and Turner (1991), Graetz (1991), Politi et al. (1994), Goldberg et al. (1997), Hu et al. (2007), McCabe et al. (2008), and Serrano-Aguilar et al. (2009) for papers using GHQ-12 in medicine and psychology.

[4]To the best of our knowledge, the BHPS is the only publicly available database with individual-level, longitudinal, information on mental health for a representative sample of residents over a long time span, coupled with a wealth of information on demographics, job histories, and family ties. In comparison, other databases containing information on individuals' health sometimes cover just a subset (typically the older part) of the population (e.g., the Health and Retirement Study for the US, the English Longitudinal Study of Ageing for the UK, and the Survey of Health, Ageing and Retirement for Europe). Other representative databases either are based on cross-sectional surveys, and thus do not allow researchers to follow individuals over time (e.g., the Behavioral Risk Factor Surveillance System for the US) or, when they have a panel structure, they do not report information on mental health in each year (e.g., the Socio Economic Panel for Germany reports mental health data once every two years, and the National Longitudinal Survey of Youth for the US only in some waves). In 2009, the BHPS was replaced by Understanding Society. The different sample composition, and the fact that each wave of Understanding Society spans two years instead of one, makes it difficult to combine the BHPS with Understanding Society for the purposes of our analysis.

[5]Health and Social Care Data Center; 2003 is the first available year.

Figure 1: Import Competition and Mental Distress in the UK




*Notes*. Source: British Household Panel Survey (1992-2008); Eurostat-Comext; UK Office for National Statistics; and World Input-Output Database. GHQ-12 is an index that ranges from 0 to 36, with higher values indicating higher levels of mental distress. Import competition is the ratio of imports over absorption (production plus imports minus exports). Each observation corresponds to the average value of the respective measure in a given year for the UK.

capita GDP and a drop in unemployment from 8.7 to 5.3%, the share of total imports in UK GDP has risen by 10% (from 24.8 to 27.3%), while the share of exports has stagnated at around 25% (World Development Indicators). Figure 1 suggests that the growth in import competition and mental distress over this period could be related to each other. The figure reports raw data on GHQ-12 and import competition for all available years, showing that both import competition and mental distress have trended upward in the long run, and have followed a close evolution also from year to year.

The empirical strategy we use for identifying the effect of trade exposure on mental distress consists of comparing GHQ-12 scores across individuals who have similar observable characteristics and are employed in similar industries, except for the import competition shocks. We condition the estimation on individual fixed effects, which remove time-invariant differences in the level of mental distress across workers (e.g., due to differences in risk factors) and imply that we exploit within-person variation over time for identification. We also control for full sets of sector×year, occupation×year, and local labor market×year fixed effects, which flexibly absorb any other time-varying determinant of mental distress operating at the sector, occupation, and local level. To account for possible remaining correlation between import competition and other domestic shocks to individual UK industries within sectors, we instrument import competition using exports from foreign countries to destinations other than the UK. This IV strategy is meant to isolate the variation in UK import competition due to changes in supply conditions in the exporting countries. To avoid selection problems due to the potential sorting

of workers across industries in anticipation of future trade shocks, we construct the instrument for each worker in her pre-sample industry of employment.[6] We also perform a falsification test showing that future import competition shocks do not explain past levels of mental distress. This further supports the view that our results reflect industry-level shocks due to rising trade exposure, rather than trends or time-varying confounds.

We find that import competition shocks strongly worsen individual mental distress. Our estimates imply that a one standard deviation increase in trade exposure raises GHQ-12 by 1.5 percentage points. This corresponds to about 15.6% of the within-individual standard deviation of mental distress. This effect is comparable to that of a commensurate increase in crime rates across UK local areas, as estimated by Dustmann and Fasani (2016).[7] To further quantify the effect, we compute the monetary compensation that the representative worker would need to make up for the ensuing utility loss. Mapping GHQ-12 scores into a health-based quality-of-life index, we find that this compensation would amount to £300 per person in a year.[8] A simple back-of-the-envelope calculation suggests that the average import shock would entail a total annual compensation of roughly £6.8 billion across all workers, i.e., about 0.5% of UK GDP. We find that import competition shocks also affect other proxies for mental distress, such as: the probability of suffering from health problems related to anxiety and depression, use of alcohol and drugs, or strokes; the likelihood of becoming a smoker and the number of cigarettes smoked; and the probability that GHQ-12 exceeds critical thresholds such as the one associated with suicidal ideation.

Having studied how the mental distress of the average worker in an industry responds to trade exposure, we turn to investigating how the effects of import competition shocks vary across workers within industries. Using recent techniques for the IV estimation of quantile regression models with fixed effects (Powell, 2016), we find the impact of trade exposure to grow monotonically, and sharply, in size along the distribution of GHQ-12. In particular, the estimated coefficient at the 95th percentile is four times larger than the (non-significant) coefficient at the 25th percentile. We further characterize the heterogeneity in the effects of import competition shocks across workers within industries using information on demographics and job characteristics. We find that the effects are systematically stronger for workers who are young, have either no family or a numerous family, have a poor financial situation, are employed in blue-collar jobs, and have a short tenure with the current employer. Overall, these novel results imply that trade exposure worsens inequality in subjective wellbeing not only by inducing a relative increase in mental distress for the average workers in more exposed industries, but also by widening the distribution of mental distress across workers within industries.

These findings raise the question of what individual-level mechanisms could underlie the

[6] Autor et al. (2014) use a similar IV strategy for identifying the effect of Chinese import competition at the industry level on the earnings of American workers. Hummels et al. (2014) use a similar approach to identify the effects of offshoring on individual wages at Danish firms.

[7] See also Cornaglia et al. (2014) for additional evidence on the effects of crime on mental health.

[8] To put this figure in perspective, the depreciation of the British pound following the Brexit vote is estimated to have cost the average UK worker an amount of £448 in a year in terms of reduced growth in real wages due to higher prices (Breinlich et al., 2017).

effects of trade exposure on mental distress. A first natural candidate is job displacement, given that unemployment and job losses are known to be associated with significant increases in mental distress.[9] Consistent with this evidence, we find a strong positive correlation between job displacement and GHQ-12 in our data. At the same time, we find that import competition shocks substantially raise the likelihood for a worker to switch out of employment.[10] These findings suggest that trade exposure indeed increases mental distress through job displacement. Interestingly, however, we find that the effects of import competition are not limited to displaced workers, but also extend to continuously employed individuals. One channel through which this happens is related to wage changes. In particular we find that, in the subsample of employed workers, GHQ-12 increases sharply when wage growth decreases.[11] In turn, we find that import competition shocks lead to a significant reduction in wage growth, suggesting that stronger competitive pressure affects the mental conditions of non-displaced British workers by flattening their earnings profile.

Perhaps more importantly, we find that import shocks affect non-displaced workers also conditional on their wage growth. The consequences of globalization for people who experience no change in their observable labor market outcomes (i.e., job status and wages) remain under-studied. We find that one mechanism through which trade exposure affects the mental health of these people is by reducing their job satisfaction. Specifically, we find that individuals who are less satisfied with their job tend to be more mentally distressed.[12] At the same time, we find that import competition shocks cause a significant worsening of job satisfaction. Our data also allow us to probe deeper into the determinants of job satisfaction. We find that import competition shocks lead to a reduction in satisfaction about important working conditions, such as job security and workload. In other words, workers perceive their jobs as becoming more unstable and demanding, as if firms passed on to their employees part of the increased competitive pressure from trade. Finally, the fourth mechanism we highlight is related to changes in expectations about the future. In particular, we study the role of expectations about job promotion and the personal financial situation of each worker. We find that people with worse expectations about the future tend to have higher levels of mental distress. At the same time, we find that import competition shocks cause a significant deterioration in individuals' expectations.

In the last section of the paper, we take advantage of a distinguishing feature of the BHPS, which contains information on family ties, to study whether and how the effects of import competition shocks spill over to other members of the family. We find no significant evidence

[9] See, among many others, Ruhm (2000), Clark (2003), Sullivan and Von Wachter (2009), Tefft (2011), Marcus (2013), Black et al. (2015), Farrè et al. (2015), Case and Deaton (2017), Hollingsworth et al. (2017), and Almond et al. (2018).

[10] This finding is in line with the recent literature on the labor market effects of import competition cited at the end of this section.

[11] This result complements the evidence from studies analyzing how mental health responds to extreme wealth shocks, such as winning a lottery or experiencing a stock market crash (e.g., Ettner, 1996; McInerney et al., 2013).

[12] See Wälde (2018) and Iossa and Sacco (2018) for recent theoretical models on the psychological implications of job satisfaction.

of intra-spouse spillovers.[13] However, we find different pieces of evidence consistent with the existence of intergenerational spillovers from parents to children. In particular, the import competition shocks faced by the father tend to have detrimental effects on parental investment in children, as well as on their self-esteem and life satisfaction. All these outcomes are known to have negative repercussions on the future health and labor market outcomes of the youths (e.g., Cunha and Heckman, 2007; Currie, 2009).[14]

Besides the work cited above, our paper connects with an emerging parallel literature studying how other aspects of globalization affect individual wellbeing. Hummels et al. (2016) study the role of exports. Using matched employer-employee data for Denmark, the authors find that export shocks, by expanding the scale of firms' operations, increase the risk of injuries and illness among Danish workers, as well as their use of antidepressants and different types of medical services including visits to psychiatrists. Giuntella and Mazzonna (2015) and Giuntella, Mazzonna, Nicodemo and Vargas-Silva (2017) find that immigration improves the health of natives by inducing them to switch to less risky jobs. Looking at industrializing countries, Bombardini and Li (2016) find that the recent Chinese export growth has raised infant mortality across Chinese prefectures by increasing the level of pollution. Finally, Giuntella, Rieger and Rotunno (2017) find that imports of unhealthy food from the US have raised the prevalence of obesity across Mexican states. Our work complements these studies by highlighting a different, and not yet fully understood, mechanism through which globalization may affect individual mental health.

Our paper also connects with the broader empirical literature on the implications of import competition for the labor markets of developed countries (e.g, Autor et al., 2013, 2014, 2015; Dauth et al., 2014, 2018; Felbermayr et al., 2011; Pierce and Schott, 2016; Utar, 2014, 2018; see Autor, Dorn and Hanson, 2016, and Dorn, 2018, for updated reviews). These papers show that workers employed in import competing industries, or regions, bear significant adjustment costs to import competition, in terms of higher probability of job displacement and lower wages. Our findings suggest that trade exposure implies additional, non-pecuniary, adjustment costs for these workers, in the form of increased mental distress. These costs also extend to workers who do not witness significant changes in their labor market outcomes, through a reduction in job satisfaction and worsened expectations about the future. Clearly, because our results are identified through differences in import pressure across industries, they capture the relative effect of trade exposure. Similar to this literature, therefore, our findings do not speak to the overall welfare effects of globalization but to its distributional consequences.

The rest of the paper is organized as follows. Section 2 presents the data and the main

[13] Other studies find mixed evidence of intra-spouse spillovers for other large economic shocks such as unemployment (see, e.g., Clark, 2003; Marcus, 2013).

[14] Our finding that trade exposure entails intergenerational spillovers complements a recent empirical literature studying how parental socio-economic background affects child development. For instance, Johnston et al. (2013) and Persson and Rossin-Slater (2018) study how family shocks (e.g., ruptures) or parental mental conditions influence the well-being of children. Focusing on poor developing countries, Baird et al. (2013) and Adhvaryu et al. (2018) find that positive household income shocks in early life affect children's personality traits and future wellbeing. See Currie (2009) and Almond et al. (2018) for updated surveys of this literature.

variables used in the analysis. Section 3 illustrates our empirical specification and identification strategy. Section 4 presents some preliminary evidence. Section 5 discusses the empirical results. Section 6 concludes.

# 2 Data and Main Variables

## 2.1 The British Household Panel Survey

Our main data source is the British Household Panel Survey. The BHPS is a multi-purpose database covering a representative sample of the British population aged 16 or more from 1992 to 2008. Each individual is interviewed every year, so the BHPS is a panel data set. The survey is household based, meaning that each person within a sampled household is interviewed yearly. If an individual leaves the original household to form a new one, she keeps being interviewed, and all the new family members also become part of the survey.[15]

The BHPS has a number of features that are crucial for our analysis. In particular, it provides rich information on mental health for each individual over time, along with a wealth of individual and household characteristics including demographics, job history, industry of employment, and occupation. We use the information on the industry of employment to match the individual-level data from the BHPS with measures of import competition and other industry characteristics (described below). Finally, the BHPS contains information on intra-household relations, allowing us to link each individual to the spouse, co-habiting partner, and children. The richness of the resulting data set allows us to: (i) study the individual-level response of mental distress to import competition shocks in the industry of employment; (ii) explore heterogeneity in the effects across workers within industries; (iii) investigate the individual-level mechanisms underlying the effects; and (iv) study intra-household spillovers.

## 2.2 The Measure of Mental Distress

Our main measure of mental distress is the 12-item version of the Generalized Health Questionnaire indicator (GHQ-12), which is available in each wave of the BHPS. GHQ-12 is based on twelve questions related to three clinically meaningful factors: anxiety and depression, social dysfunction, and loss of confidence. Each question can be answered in four ways, denoting different levels of distress. Answers are assigned a value from 0 to 3, so that higher numbers always indicate higher mental distress.

[15]The nature of the BHPS implies that some individuals may not be observed in all years. In particular, some individuals belonging to surveyed households may turn 16—and thus start to be interviewed—over the sample period. Others may join existing surveyed households, or form new families with a member of the households that are already present in the survey. Finally, some people may die over the period of analysis or may not report their information in some years. Lynn (2006) finds that the wave-on-wave retention rate in the BHPS is very high, at approximately 95%. Uhrig (2008) studies patterns of attrition in the BHPS and finds that attrition is not related to mental health measures, including the one used in this paper. We find that in our sample neither import competition nor the past level of mental distress predict the probability of not responding to the mental health question in one year. In particular, regressing a dummy equal to 1 for non respondents on import competition and past mental health, plus individual and year fixed effects, we obtain coefficients equal to -0.0000441 (s.e. 0.0010437) for import competition and to 0.0000127 (s.e. 0.0000745) for mental health.

Table 1: GHQ-12 - Questions and Answers

| GHQ-12 Component | Questions and Answers |
|---|---|
| | **Questions** |
| | Have you recently: |
| Anxiety and depression | 1) lost much sleep over worry? |
| | 2) felt constantly under strain? |
| | 3) felt you couldn't overcome your difficulties? |
| | 4) been feeling unhappy or depressed? |
| Social dysfunction | 5) been able to concentrate on whatever you're doing? |
| | 6) felt that you were playing a useful part in things? |
| | 7) felt capable of making decisions about things? |
| | 8) been able to enjoy your normal day-to-day activities? |
| | 9) been able to face up to problems? |
| | 10) been feeling reasonably happy, all things considered? |
| Loss of confidence | 11) been losing confidence in yourself? |
| | 12) been thinking of yourself as a worthless person? |
| | **Answers** |
| | not at all; no more than usual; rather more than usual; much more so than usual |

*Notes*. Source: British Household Panel Survey.

The twelve questions and the four answers are listed in Table 1. The GHQ-12 indicator is obtained as the sum of the values taken by the answers to the twelve questions. As such, it ranges from 0 (least distressed) to 36 (most distressed).[16] In our regressions, we rescale the index to range between 0 and 100, so that each regression coefficient can be interpreted as the percentage point effect of the corresponding variable on mental distress.

A large literature in medicine and psychiatry shows that GHQ-12 has remarkable properties. In particular, it correlates well with the main symptoms of depression and nicely reflects both upward and downward changes in mental health (e.g., Graetz, 1991; Politi et al., 1994; Goldberg et al., 1997; Hu et al., 2007; McCabe et al., 2008). For these reasons, GHQ-12 is widely used by clinicians to detect psychiatric illness (Goldberg, 1978; Serrano-Aguilar et al., 2009) and its use in academic research on mental health is nowadays standard across different disciplines, including economics (see, most notably, Clark and Oswald, 1994; Clark, 2003; Oswald and Powdthavee, 2008; MacKerron, 2012; Dustmann and Fasani, 2016). More importantly for the purpose of this paper, using GHQ-12 allows us to capture the entire spectrum of mental distress cases, including those that do not evolve into extreme clinical conditions measurable through proxies such as use of antidepressants, hospitalization rates, and suicides.

GHQ-12 is well suited for detecting short-run within-individual changes in mental distress, since each person must answer every question compared to her usual condition. The reference point could differ across individuals and change over time for the same person. In all regressions, we control for individual fixed effects, which soak up time-invariant differences in the reference point (as well as in any risk factor) across individuals.[17] As for the time variation,

[16] This is known as 'Likert scoring method'. Our results are robust to the use of an alternative scoring technique, known as 'Caseness bimodal scoring', in which the two answers corresponding to the lowest levels of distress are assigned a value of 0 and the other two answers a value of 1, with the resulting GHQ-12 ranging from 0 to 12.

[17] Controlling for individual fixed effects also mitigates concerns with the fact that individuals may have different 'reporting functions' (Bond and Lang, 2018), such that two people with the same level of mental distress may

recent studies show that the adaptation to significant economic shocks (e.g., unemployment) proceeds slowly, with the reference point normally taking five or more years to adjust (Clark and Georgellis, 2013; Ferrer-i Carbonell and Van Praag, 2008). We take account of this fact when constructing the measure of import competition shocks, which is what we turn to next.

### 2.3 Import Competition Shocks

We link the individual-level data from the BHPS with data on import competition at the industry level. We observe workers employed in 119 industries (mostly classified at the 3-digit level of the NACE Rev. 1.1 classification), which span the entire UK economy except for the public sector. Out of these industries, 100 are in the manufacturing sector and the remaining 19 are in the service sector. Including both sectors in our analysis is important for representativeness. Indeed, in 2007, manufacturing and services employed 12 and 56%, respectively, of the total UK labor force (World Input-Output Database; Timmer et al., 2015), and accounted for 68 and 32%, respectively, of total UK imports (World Development Indicators).[18]

Following previous studies (e.g., Autor et al., 2014), we define import competition as the ratio of imports over absorption (production plus imports minus exports).[19] For the manufacturing industries, we source trade data from Eurostat-Comext, and production data from the UK Office for National Statistics. For the service industries, we use official data on trade and production from WIOD. The first year with complete trade data for all industries is 1995.

When constructing the import competition shocks undergone by a worker, we face a trade-off. On the one hand, we ideally would like to pick up shocks that affect the level of mental distress without altering the reference point of the individual. This is more likely to be the case for import competition shocks occurring over short time spans. On the other hand, import competition is volatile over short time horizons, and this volatility need not reflect the type of protracted changes in trade exposure that could have implications for individuals' mental distress. We sort out this trade-off by using as the baseline definition of the shocks the percentage change in import competition in a worker's industry of employment over the previous five years. In Section 5.1.2, we study the sensitivity of our results to the use of alternative windows, finding that the actual definition of the shock has in fact no bearing on our main conclusions.

systematically end up having two different values of GHQ-12. Moreover, in Section 5.1.3, we construct alternative measures of mental distress by benchmarking GHQ-12 against some relevant thresholds (i.e., for psychiatric disorder or suicidal ideation). While there might be some noise in the levels of GHQ-12, this noise is unlikely to systematically determine whether an individual falls above or below a certain threshold.

[18] Over 1995-2007, the composition of UK imports has changed, with the share of manufacturing in total imports falling by 8 percentage points and the share of services rising accordingly. The growing importance of services in total imports has been previously documented for the UK (Amiti and Wei, 2005) and reflects a trend that is common to other developed countries (see, e.g., Crinò, 2010, and Liu and Trefler, 2018, for evidence on the US).

[19] In Section 5.1.3, we show that our results are unchanged when using different normalizations instead of absorption.

## 3 Empirical Strategy and Estimation Sample

The identification strategy we use for estimating the effect of import competition on individuals' mental distress consists of comparing GHQ-12 scores (or other proxies) across workers who have similar individual characteristics, live in similar households, and are employed in industries with similar attributes but hit by import competition shocks of different size.

To operationalize this strategy, we estimate variants of the following specification:

$$MD_{it} = \alpha_i + \alpha_m + \alpha_h + \alpha_{st} + \alpha_{ot} + \alpha_{lt} + \beta_1 ICS_{jt-1} + \mathbf{I}_{it-6}\gamma_1^{'} + \mathbf{J}_{jt-6}\gamma_2^{'} + \varepsilon_{it}, \quad (1)$$

where $MD_{it}$ is a measure of the mental distress of individual $i$ in year $t$; $\alpha_i$ are individual fixed effects; $\alpha_m$ and $\alpha_h$ are fixed effects for the month and the hour of the interview, respectively; $\alpha_{st}$, $\alpha_{ot}$, and $\alpha_{lt}$ are sector$\times$year, occupation$\times$year, and local labor market (LLM)$\times$year fixed effects, respectively; $ICS_{jt-1}$ is the import competition shock undergone by the industry $j$ in which the individual was employed or self-employed in year $t-1$. $\mathbf{I}_{it-6}$ and $\mathbf{J}_{jt-6}$ are vectors of controls for pre-existing individual and industry characteristics, respectively; and $\varepsilon_{it}$ is an error term.

We use the import competition shock in the industry of employment at $t-1$ for two reasons. First, individuals in the BHPS are interviewed in different months, so using the lagged value of $ICS$ ensures that every individual has been exposed to the shock for at least one full year. Second, and more importantly, using the lag of $ICS$ allows us to include job displacement among the mechanisms we analyze in Section 5.3. Indeed, eq. (1) connects the current mental distress of an individual, regardless of her job status at time $t$, with the import competition shock undergone by her industry at $t-1$. If instead we used the current value of $ICS$, our estimation sample would only comprise individuals who are currently employed.

The vectors $\mathbf{I}_{it-6}$ and $\mathbf{J}_{jt-6}$ contain controls for observable characteristics six years before the current realization of mental distress. Because each import competition shock is defined as the change in import competition over a five-year period, and we use the first lag of $ICS$, these controls allow us to compare individuals with similar ex-ante observable characteristics. $\mathbf{I}_{it-6}$ contains standard demographics: age and its square, household size, an indicator for physical health, and dummies for educational level, marital status, self-employment, household type, and home ownership.[20] $\mathbf{J}_{jt-6}$ contains industry characteristics: real output and value added, to control for differences in industry size and productivity; output price, to control for differences in the degree of domestic competition across industries; employment share of high-skill workers, to control for differences in factor intensities and technology; and export intensity (exports over output), to control for differences in export exposure across industries.

[20]The indicator for physical health is based on eleven BHPS questions. Each question asks the respondent to report whether or not she suffered from a specific health problem in each year. The indicator is computed as the sum of the scores obtained in each question: 0 in case of no problem and 1 in case of reported problems. The indicator is then rescaled to range between 0 and 100. The eleven health questions concern problems with: arms, legs, neck and the like (including arthritis and rheumatism); sight; hearing; skin conditions and allergies; chest/breathing; hearth/blood pressure and circulation; stomach, liver, kidneys and digestion; diabetes; epilepsy; migraine or frequent headaches; other. We use earlier values of a given individual characteristic when its sixth lag is missing.

As already mentioned, the individual fixed effects $\alpha_i$ soak up time-invariant determinants of mental distress at the individual level, and imply that identification relies on within-individual changes in mental distress over time. We also include additional fixed effects to absorb other possible confounds. $\alpha_m$ and $\alpha_h$ control for potential fluctuations in mental distress across the different months or hours of the day in which each interview has taken place. Moreover, and crucially, $\alpha_{st}$, $\alpha_{ot}$, and $\alpha_{lt}$ flexibly absorb many other time-varying determinants of mental distress that may confound the effect of trade exposure. Specifically, $\alpha_{st}$ accounts for sector-specific shocks, such as technical change, automation, and financial shocks. We define sectors as 2-digit industries.[21] Accordingly, after controlling for $\alpha_{st}$, identification only relies on the remaining variation in $ICS$ across the 3-digit industries belonging to the same 2-digit sector. $\alpha_{ot}$ absorb occupation-specific shocks, such as the introduction of a new labor regulation or differential changes across occupations in their exposure to technical change and globalization.[22] Finally, $\alpha_{lt}$ control for LLM-specific shocks such as crime, health policies, changes in the supply of health care services, and both technology and globalization shocks at the local level.[23] The three sets of fixed effects also account for potential time-varying compositional effects, in that they also absorb sector-, occupation-, and region-specific changes in average individual characteristics potentially correlated with $ICS$.

These large sets of fixed effects substantially mitigate concerns with omitted variables. The OLS estimate of $\beta_1$ could still be biased, however, for two reasons. First, even after accounting for sector$\times$year fixed effects, some confounding factor may remain that correlates with $MD$ and $ICS$ across narrow 3-digit industries. For instance, a positive domestic demand shock in an industry could raise imports and lead to an improvement in the mental health of workers employed in that industry, causing a downward bias in the OLS estimate of $\beta_1$. Technological shocks or structural transformation could instead put some industries on a declining path, causing greater distress for workers and increasing reliance on foreign imports, thereby leading to an upward bias in the OLS estimate of $\beta_1$. Second, workers may sort across industries based on their mental distress and in anticipation of future import competition shocks. If more mentally distressed individuals sorted into less trade exposed industries, the OLS estimate of $\beta_1$ would be downward biased; the opposite sorting pattern would instead induce an upward bias.

To account for these issues, in a similar spirit to Autor et al. (2014), we instrument $ICS$ using the five-year percentage change in exports from foreign countries to all destinations excluding the UK ($World\ exp$). This instrument is meant to isolate the variation in UK imports that is due to changes in supply conditions in the origin countries, rather than to domestic industry-specific shocks in the UK. For each worker, we construct the instrument in her pre-sample industry of employment, so that worker cross-industry sorting does not induce a correlation

[21] The service industries are less disaggregated than the manufacturing industries, and are thus treated as a single sector.

[22] We define occupations as major occupational codes in the Standard Occupational Classification (SOC).

[23] In the UK, LLM are defined as travel-to-work areas. To identify these areas, we obtained access to restricted data on the location of each household at the postcode level ('lower layer super output areas'), and mapped this information into travel-to-work areas using a correspondence table provided by the UK Office for National Statistics.

between the instrument and the error term in eq. (1).[24] The identifying assumption is that, conditional on all the covariates and fixed effects included in eq. (1), demand or technology shocks in the UK are orthogonal across industries to the shocks occurring in other countries. The fact that the other countries comprise very different economies, both in terms of geographic location and level of development, works in favor of this assumption. Moreover, throughout the analysis, we exclude from the construction of the instrument both the US and Canada, the two economies whose industrial structure and cyclical fluctuations are most similar to those of the UK (Helpman et al., 2004; Artis et al., 2004). In Section 5.1.2, we also show that our results remain unchanged when we restrict even further the set of origin and destination countries used to define the instrument, as well as when we exclude from the estimation sample different sets of industries for which unobserved shocks are more likely to be correlated across countries within sectors.

Due to the inclusion of individual fixed effects, eq. (1) is estimated on workers whose GHQ-12 is reported for two years or more. Moreover, since the import competition shock entails the use of six years of data and the instrument refers to the pre-sample industry of employment, individuals must be in the labor market at least seven years before the first observation of GHQ-12 used in the estimation. Given that the trade data are available since 1995, our estimation sample starts with the 2001 wave of the BHPS and ends in 2007, the year before the Great Recession. We use previous waves of the BHPS (i.e., from 1992 to 2000) to retrieve information on demographics and job histories. For concreteness, consider an individual who is observed for the first time in the labor market prior to 1995. Her first trade shock is the change in import competition between 1995 ($t-6$) and 2000 ($t-1$), the pre-sample industry of employment refers to 1994 or earlier, and the first observation of GHQ-12 used for estimation refers to 2001 ($t$). If instead an individual is observed for the first time in the labor market in 1995 or later, say 1998, we proceed as follows. We construct the shock as the change in import competition from 1999 to 2004, take 1998 as the pre-sample industry of employment, and use GHQ-12 scores from 2005 onwards. Accordingly, individuals who enter the labor market after 2000 are not part of the estimation sample. The latter consists of 29,459 observations corresponding to 7,057 individuals.

# 4 Descriptive Statistics and Preliminary Evidence

Table 2 reports summary statistics on the individual-level variables used in the analysis, both for the raw BHPS data and for our final estimation sample. The two samples display a similar composition. The average age of individuals is 44 years, and there is an equal proportion of males and females. Three-fourths of the sample consist of individuals who are married or live as a couple, either with no dependent children (44%) or with some dependent child (37%). Average household size is 3 people. Roughly 20% of individuals have first or higher degrees of

[24] At the same time, sorting in the pre-sample industry of employment is accounted for by the individual fixed effects.

Table 2: Descriptive Statistics on Individual-Level Variables

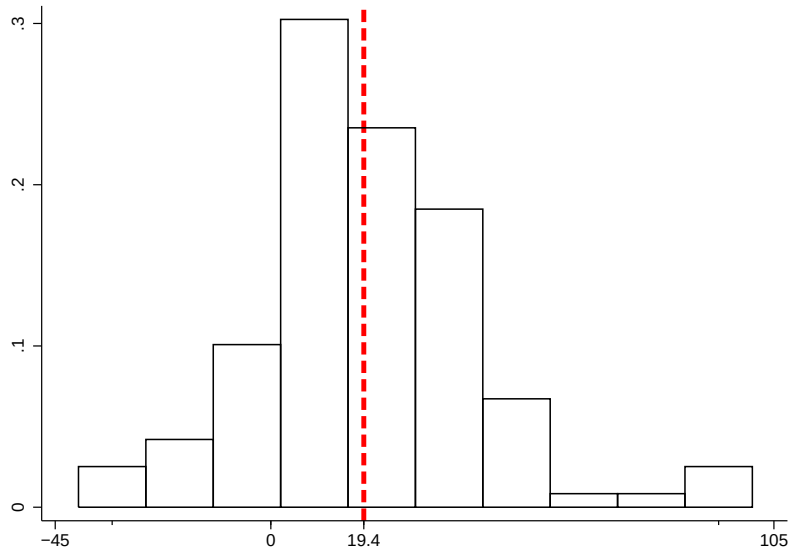
| | Estimation Sample | | | Original Sample | | |
|---|---|---|---|---|---|---|
| | Mean | Std. Dev. | Obs. | Mean | Std. Dev. | Obs. |
| GHQ-12 - Overall | 30.32 | 14.28 | 29459 | 29.94 | 14.20 | 47603 |
| GHQ 12 - Anxiety and depression | 31.08 | 20.09 | 29459 | 30.62 | 20.09 | 47603 |
| GHQ 12 - Social dysfunction | 34.19 | 12.75 | 29459 | 33.79 | 12.66 | 47603 |
| GHQ 12 - Loss of confidence | 17.18 | 20.66 | 29459 | 17.05 | 20.72 | 47603 |
| Physical health | 9.37 | 11.34 | 29459 | 8.36 | 10.98 | 51761 |
| Age | 43.72 | 11.29 | 29459 | 41.32 | 12.33 | 51758 |
| Male | 0.51 | 0.50 | 29459 | 0.52 | 0.50 | 51761 |
| Married | 0.64 | 0.48 | 29459 | 0.60 | 0.49 | 51725 |
| Leaving as couple | 0.13 | 0.34 | 29459 | 0.14 | 0.35 | 51725 |
| Widowed | 0.01 | 0.12 | 29459 | 0.01 | 0.11 | 51725 |
| Divorced | 0.07 | 0.25 | 29459 | 0.05 | 0.23 | 51725 |
| Separated | 0.02 | 0.13 | 29459 | 0.02 | 0.14 | 51725 |
| Never married | 0.13 | 0.33 | 29459 | 0.17 | 0.38 | 51725 |
| Single non-elderly | 0.09 | 0.29 | 29459 | 0.08 | 0.28 | 51761 |
| Single elderly | 0.01 | 0.10 | 29459 | 0.01 | 0.09 | 51761 |
| Couple, no children | 0.29 | 0.45 | 29459 | 0.27 | 0.45 | 51761 |
| Couple, dep. children | 0.37 | 0.48 | 29459 | 0.38 | 0.48 | 51761 |
| Couple, non-dep. children | 0.15 | 0.35 | 29459 | 0.15 | 0.36 | 51761 |
| Lone parent, dep. children | 0.04 | 0.19 | 29459 | 0.04 | 0.20 | 51761 |
| Lone parent, non-dep. children | 0.03 | 0.18 | 29459 | 0.04 | 0.19 | 51761 |
| 2+ unrelated adults | 0.01 | 0.10 | 29459 | 0.01 | 0.11 | 51761 |
| Other households | 0.01 | 0.11 | 29459 | 0.01 | 0.12 | 51761 |
| Household size | 2.93 | 1.24 | 29459 | 3.02 | 1.28 | 51761 |
| Higher degree | 0.04 | 0.19 | 29459 | 0.04 | 0.20 | 47649 |
| First degree | 0.16 | 0.36 | 29459 | 0.15 | 0.36 | 47649 |
| Teaching QF | 0.03 | 0.16 | 29459 | 0.02 | 0.15 | 47649 |
| Other higher QF | 0.36 | 0.48 | 29459 | 0.32 | 0.47 | 47649 |
| Nursing QF | 0.01 | 0.09 | 29459 | 0.01 | 0.09 | 47649 |
| GCE A levels | 0.11 | 0.31 | 29459 | 0.12 | 0.33 | 47649 |
| GCE O levels or equivalent | 0.16 | 0.36 | 29459 | 0.17 | 0.38 | 47649 |
| Commercial QF, no O levels | 0.02 | 0.13 | 29459 | 0.02 | 0.13 | 47649 |
| CSE grade 2-5, scot grade 4-5 | 0.03 | 0.17 | 29459 | 0.03 | 0.18 | 47649 |
| Apprenticeship | 0.01 | 0.09 | 29459 | 0.01 | 0.10 | 47649 |
| Other QF | 0.00 | 0.06 | 29459 | 0.00 | 0.07 | 47649 |
| No QF | 0.08 | 0.28 | 29459 | 0.10 | 0.30 | 47649 |
| Owned house or on mortgage | 0.85 | 0.36 | 29459 | 0.83 | 0.37 | 50538 |
| Shared house ownership | 0.00 | 0.06 | 29459 | 0.00 | 0.07 | 50538 |
| Rented house | 0.13 | 0.34 | 29459 | 0.15 | 0.36 | 50538 |
| Rent-free house | 0.01 | 0.10 | 29459 | 0.01 | 0.10 | 50538 |
| Other house types | 0.00 | 0.06 | 29459 | 0.00 | 0.05 | 50538 |

*Notes*. Source: British Household Panel Survey, 2001-2007. The original sample consists of individuals who were either employed or self-employed in the previous year.

education, while 8% of people have no qualification. Finally, 85% of individuals own a house and 13% live in a rented flat.

Turning to the mental health indicators, GHQ-12 is equal to 30 (on a 0-100 scale) on average, with an overall standard deviation of 14.3. The within-individual standard deviation (untabulated) is equal to 9.6, which corresponds to 67% of the overall variation in GHQ-12. Table 2 also reports information on the three components of GHQ-12 related to anxiety and depression, social dysfunction, and loss of confidence, respectively. Each component is computed by summing the answers to corresponding questions (see Table 1) and rescaled between 0 and 100. The two components of GHQ-12 related to anxiety and depression and social dysfunction are slightly higher than the one related to loss of confidence, the mean (standard deviation) of these components being equal to 31.1 (20.1), 34.2 (12.7), and 17.2 (20.7), respectively.

Figure 2: Distribution of Import Competition Shocks across Industries



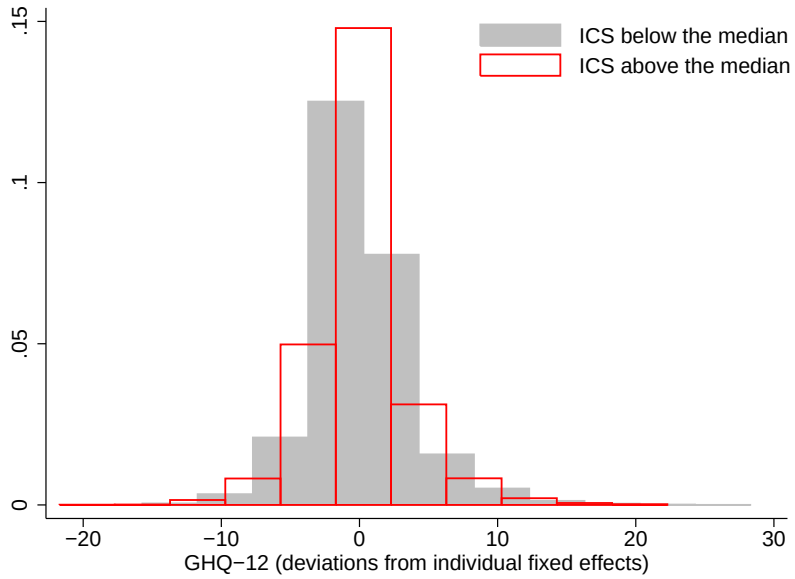

*Notes*. The figure plots the distribution of the industry-level averages of the import competition shocks *ICS* over the period 2001-2007. The dashed line corresponds to the sample mean (19.4%).

As for the import competition shock, Figure 2 shows the distribution of the average value of *ICS* across the 119 industries in our sample. The mean is 19.4 and the standard deviation 23.1, which roughly corresponds to the difference between the industry at the 25th percentile of the distribution (6.7%) and the industry at the 75th percentile (32.2%). These figures indicate that competitive pressure from foreign countries has substantially intensified in the UK over the period of analysis. There is also significant variation across industries: some of them have received large shocks, with *ICS* exceeding 50% on average (e.g., Manufacturing of TV and radios; Manufacturing of agrochemicals; Manufacture of refined petroleum products); others have instead experienced a reduction in foreign competitive pressure, with the average value of *ICS* being below -20% (e.g., Manufacture of vegetable and animal oil; Water transport; Production of steam generators).

Our measure of import competition includes import flows into the UK from all countries in the world, thereby encompassing major exporters of both goods and services. To have a sense of the geographical composition of UK imports, in 2007, the top-3 origin countries were Germany, France, and the Netherlands for the manufacturing sector, and the US, Germany and Ireland for the service sector (WIOD). Over the sample period, the three countries with the largest increase in their share in total UK imports have been Slovakia, Czech Republic, and Hungary for the manufacturing sector, and Romania, Poland, and India for the service sector.[25]

[25]In 2007, China occupied the fourth position in the ranking of import shares for the manufacturing sector (fifth position in terms of import share growth over the sample period) and the eleventh position in the ranking for the service sector (sixteenth position in terms of growth). For comparison, in the US, China was the second exporter in both sectors in 2007, and among the top-3 countries in terms of import share growth over the sample period, again in both sectors (WIOD). The trends in the geographical composition of UK imports, and in particular the rising role

Figure 3: Distribution of GHQ-12 by Industry Trade Exposure




*Notes*. The figure plots the distribution of GHQ-12 scores (deviated from individual fixed effects) across industries with *ICS* below the sample median and above the sample median.

Figure 3 provides preliminary, non-parametric, evidence on the relation between GHQ-12 and trade exposure. The figure plots the distribution of GHQ-12 scores (deviated from individual fixed effects) across industries with *ICS* below the sample median (full grey bars) and above the sample median (hollow red bars). The distribution of GHQ-12 in highly trade exposed industries is shifted rightward compared to that in other industries. This suggests that workers exposed to larger import competition shocks could experience an increase in their levels of mental distress compared to other workers. We now turn to regression analysis to identify and quantify the effect of import competition shocks on individual mental distress.

# 5 Results

We organize the presentation of the empirical results in four sections. We start by providing evidence that import competition shocks induce a significant increase in the mental distress of exposed workers (Section 5.1). Then, we study how these effects vary along the distribution of GHQ-12, and analyze how they are perceived by different categories of workers within an industry (Section 5.2). We continue by exploring the mechanisms through which the effects take place (Section 5.3). Finally, we study whether and how the implications of trade exposure spill over to the members of a worker's family (Section 5.4).

played by Eastern European countries, resemble the changes occurred in other industrialized European countries such as Germany (Dauth et al., 2014).

## 5.1 Import Competition and Individual Mental Distress

### 5.1.1 Baseline Estimates

The baseline estimates of eq. (1) are presented in Table 3. Panels a) and b) report the Two-Stage Least Square (2SLS) estimates (second and first stage, respectively); panel c) contains the OLS estimates; and panel d) shows the reduced-form estimates obtained by regressing GHQ-12 directly on the instrument (*World exp*). We rescale *ICS* by its overall standard deviation, so that the coefficient $\beta_1$ measures the percentage point (p.p.) change in GHQ-12 following a one standard deviation (s.d.) increase in *ICS*. The standard errors are corrected for clustering both by individual and by sector (i.e., two-way clustering), so as to allow for correlation in the error term both for the same person over time and across individuals employed in the same sector.[26]

In column (1), we start with a parsimonious specification only controlling for individual and year fixed effects. In the first-stage regression, the coefficient on *World exp* has the expected positive sign and is very precisely estimated, with a point estimate of 0.158 (s.e. 0.023). This implies that a one s.d. increase in *World exp* is associated with a 0.16 s.d. increase in *ICS*, pointing to the instrument being a strong predictor of UK import competition shocks. The Kleibergen-Paap *F*-statistics for the excluded instrument is indeed very high, at 46.1. Turning to the second stage, the coefficient $\beta_1$ is positive and highly statistically significant, with a point estimate of 1.58. This implies that a one s.d. increase in *ICS* leads to a 1.5 p.p. increase in GHQ-12.

In the following columns, we progressively add further controls until we reach our full specification as in eq. (1). Specifically, we include the dummies for month and hour of the interview (column 2); the controls for pre-shock (i.e., at $t-6$) individual characteristics (column 3); the controls for pre-shock industry characteristics (column 4); sector$\times$year fixed effects (column 5); occupation $\times$year fixed effects (column 6); and, finally, LLM$\times$year fixed effects (column 7). The results are stable across the board, in terms of sign, significance, and size of the coefficient $\beta_1$.

Using the estimates from our preferred specification in column (7), we can quantify the effect of import competition shocks on individual mental distress. Given that GHQ-12 has an overall standard deviation of 14.3 and a within-individual standard deviation of 9.6, a coefficient $\beta_1$ equal to 1.53 implies that a one s.d. increase in *ICS* explains a sizable 10.5% (15.6%) of the overall (within-individual) standard deviation of GHQ-12. As a counterfactual, this effect is roughly equivalent to what would be obtained by moving a worker from the industry at the 25th percentile of the distribution of *ICS* to the industry at 75th percentile. To put our evidence in perspective, this effect is also comparable to that of a one s.d. increase in crime rates across British local areas, as estimated by Dustmann and Fasani (2016).

To provide further evidence on the economic magnitude of the effect, we estimate the annual amount of money that would be necessary to compensate the average worker for the increase in mental distress caused by a rise in trade exposure. To this purpose, we need to map

[26] Alternative clustering schemes, e.g., by narrow 3-digit industry, by sector-year, and by industry-year yield similar results, available upon request.

Table 3: Baseline Estimates

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | a) 2SLS (second stage) | | | | | | |
| *ICS* | 1.577*** | 1.541*** | 1.750*** | 1.834*** | 1.689*** | 1.937*** | 1.533*** |
| | [0.324] | [0.318] | [0.330] | [0.389] | [0.314] | [0.413] | [0.422] |
| $R^2$ | 0.54 | 0.54 | 0.54 | 0.54 | 0.55 | 0.55 | 0.58 |
| Obs. | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 |
| | b) 2SLS (first stage) | | | | | | |
| *World exp* | 0.158*** | 0.158*** | 0.157*** | 0.145*** | 0.163*** | 0.141*** | 0.138*** |
| | [0.023] | [0.023] | [0.024] | [0.023] | [0.010] | [0.007] | [0.007] |
| Kleibergen-Paap *F*-stat. | 46.1 | 45.9 | 43.8 | 41.2 | 261.7 | 418.2 | 371.9 |
| | c) OLS | | | | | | |
| *ICS* | 0.158** | 0.162** | 0.160** | 0.187*** | 0.241*** | 0.217*** | 0.240*** |
| | [0.066] | [0.067] | [0.066] | [0.054] | [0.026] | [0.030] | [0.037] |
| $R^2$ | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.58 |
| Obs. | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 |
| | d) Reduced-Form (OLS) | | | | | | |
| *World exp* | 0.249*** | 0.243*** | 0.274*** | 0.265*** | 0.276*** | 0.274*** | 0.212*** |
| | [0.040] | [0.040] | [0.042] | [0.042] | [0.048] | [0.056] | [0.060] |
| $R^2$ | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.58 |
| Obs. | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | | | |
| Interview FE | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual controls | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry controls | | | | ✓ | ✓ | ✓ | ✓ |
| Sector×year FE | | | | | ✓ | ✓ | ✓ |
| Occupation×year FE | | | | | | ✓ | ✓ |
| LLM×year FE | | | | | | | ✓ |

*Notes*. The dependent variable is GHQ-12, rescaled between 0 and 100. *ICS* is the five-year percentage change in import competition (the ratio of imports over absorption) in the worker's industry of employment during the previous year, rescaled by the sample overall standard deviation. *World exp* is the five-year percentage change in the exports of foreign countries to all destinations excluding the UK, computed in each worker's pre-sample industry of employment and rescaled by the sample overall standard deviation; the US and Canada are not included in either the origin or destination countries. *Interview FE* include month and hour of interview fixed effects. *Individual controls* include the sixth lag of: age and its square, physical health, household size, and dummies for education level, marital status, self-employment, household type, and home ownership. *Industry controls* include the sixth lag of real output, output price, employment share of high-skill workers, value added, and export intensity. *Sector×year FE* are fixed effects for each 2-digit manufacturing industry and for the service sector in each year. *Occupation×year FE* are fixed effects for each major SOC occupational group in each year. *LLM×year FE* are fixed effects for each local labor market in each year. The standard errors are corrected for two-way clustering at the individual and sector level. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

GHQ-12 scores into a health-based quality-of-life index, which can then be translated into monetary terms. We adopt the EQ-5D index, for which a mapping with GHQ-12 exists in the health literature (Serrano-Aguilar et al., 2009). This mapping is such that an increase in GHQ-12 translates into a lower EQ-5D score.[27] EQ-5D is normally used for computing quality-adjusted life

[27]The EQ-5D index refers to the health utility of an individual, assessed over five dimensions: mobility, pain and discomfort, self-care, anxiety and depression, and the ability to perform usual activities. Each of the five dimensions has three levels: no problems, some problems, and major problems. Each combination of health states receives a

years (QALY), which can be assigned a monetary value. In particular, one year of life in perfect health (i.e., a yearly EQ-5D equal to its maximum value of 1) corresponds to one QALY, which is conservatively estimated to be worth £30,000 by public health agencies in the UK (McCabe et al., 2008; Cornaglia et al., 2014).

With the EQ-5D index in hand, we replicate the 2SLS specification in column (7) of Table 3, using EQ-5D scores in place of GHQ-12 as the dependent variable. We obtain a coefficient of -0.01 (s.e. 0.003).[28] This indicates that a one s.d. increase in trade exposure lowers EQ-5D by 1 p.p. in one year. The individual compensation for this loss amounts to £300 (i.e., $0.01 \times$£30,000) per person in a year. Considering that the total number of employed people in the UK was equal to 26.9 million in 2007, and that the average import competition shock is equal to 19.4% (i.e., 84% of a standard deviation), a simple back-of-the-envelope calculation suggests that the total annual compensation would amount to roughly £6.8 billion (i.e., $0.84 \times 300 \times 26.9$), about 0.5% of UK GDP.

For completeness, the bottom two panels of Table 3 provide OLS and reduced-form estimates for all the previous specifications. We note, first, that these estimates are always positive and precisely estimated. In particular, the reduced-form estimates confirm that GHQ-12 responds to shocks to UK trade exposure driven by foreign countries' export supply changes in the worker's pre-sample industry of employment. Second, by comparing the 2SLS and the OLS estimates, we note that the latter are downward biased. This is consistent with the fact that the instrument cleans the estimates from the potential confounding effect of unobserved shocks within UK 3-digit industries or worker cross-industry sorting based on mental distress and anticipated trade shocks.

We can shed light on the patterns and implications of worker sorting using the information on industry switching contained in our data. In a given year, approximately 20% of workers change industry, and 44% of individuals switch at least once over the sample period. We start by studying whether industry switching is correlated with changes in trade exposure. To this purpose, for each worker, we compute the year-to-year change in $ICS$ ($\Delta ICS$), based on her industries of employment at $t-1$ and $t$. For industry stayers, $\Delta ICS$ only reflects variation in trade exposure within the same industry, whereas for industry switchers it captures the additional change due to the switch. In column (1) of Table 4, we regress $\Delta ICS$ on a dummy equal to 1 for workers who always remain in the same industry ('stayers'). We find a small and not statistically significant coefficient, suggesting that a worker who switches industry does not experience a significantly different change in trade exposure compared to a worker who remains in the same industry. Next, we look for differential patterns of correlation between $\Delta ICS$ and the $t-1$ level of GHQ-12, for stayers and switchers separately. Columns (2) and

different score (see euroqol.org for more information). In the algorithm by Serrano-Aguilar et al. (2009), each answer of the GHQ-12 questionnaire is associated with a coefficient. The EQ-5D index score is the sum of these coefficients after adjusting for sex and age. A situation of perfect health gets a score of 1, while less than perfect health gets lower (and even negative) scores.

[28] If we rescale the EQ-5D to range between 0 and 100 (like GHQ-12), we obtain a coefficient on $ICS$ equal to -0.803 (s.e. 0.223), which is approximately 45% lower (in absolute value) than the estimate of $\beta_1$ reported in column (7). This is consistent with EQ-5D encompassing a broader concept of health, which also includes dimensions of physical health (see footnote 27).

Table 4: Cross-Industry Sorting, Mental Distress, and Trade Exposure

| | $\Delta ICS$ (1) | $\Delta ICS$ (2) | $\Delta ICS$ (3) | $GHQ$-12 (4) |
|---|---|---|---|---|
| *Stayer* | 0.008 | | | |
| | [0.013] | | | |
| $GHQ\text{-}12_{t-1}$ | | 0.000 | 0.001 | |
| | | [0.001] | [0.001] | |
| *ICS* | | | | 0.248*** |
| | | | | [0.038] |
| $R^2$ | 0.00 | 0.00 | 0.00 | 0.65 |
| Obs. | 21148 | 10969 | 10179 | 15645 |
| Sample | All | Stayers | Switchers | Stayers |

*Notes*. All regressions are estimated by OLS. The dependent variables are indicated in the columns' headings. $\Delta ICS$ is the year-to-year change in *ICS* for each worker, based on her industries of employment at $t-1$ and $t$. *Stayer* is a dummy equal to one for workers who always remain in the same industry. $GHQ\text{-}12_{t-1}$ is the one-year lag of GHQ-12. Columns (1)-(3) do not include other regressors, whereas column (4) includes the same controls and fixed effects as in column (7) of Table 3. The standard errors are corrected for heteroskedasticity in columns (1)-(3) and for two-way clustering at the individual and sector level in column (4). ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

(3) show virtually no relation between the two variables for any group of workers. Taken together, this evidence points to industry switching being largely orthogonal to the interplay of mental distress and changes in trade exposure. Consistent with this conclusion, in column (4) we re-estimate eq. (1) on the sub-sample of stayers, and find virtually no difference in the OLS estimate of $\beta_1$ compared to the baseline specification. If worker sorting was responsible for the downward bias of the OLS estimate, we would have expected a significant upward jump in the coefficient $\beta_1$ when estimated on the sub-sample of stayers.[29] Hence, these findings suggest that the main source of downward bias in the OLS estimates are unobserved domestic shocks (e.g., demand shocks) inducing a negative correlation between *ICS* and GHQ-12 across 3-digit industries within sectors.

### 5.1.2 Discussion: Threats to Identification

In this section, following Autor et al. (2013) and Autor et al. (2014), we perform a sensitivity analysis showing that our results are unlikely to be driven by the possibility that some unobserved shocks correlated across countries remain after conditioning on all the covariates and fixed effects included in eq. (1). In columns (1)-(3) of Table 5, we study how our 2SLS estimates change when we exclude groups of industries in which correlated shocks are more likely to occur. In column (1), we exclude the most cyclical industries, characterized by the highest correlation between their own output and UK GDP.[30] In column (2), we drop the most

[29] Not surprisingly, we find that the 2SLS estimate of $\beta_1$ obtained on this sub-sample is precisely estimated and not statistically different from the baseline estimate reported in column (7) of Table 3.

[30] In particular, we exclude all 3-digit industries within the following 2-digit sectors: Manufacture of coke, refined petroleum products and nuclear fuel (NACE 23); Manufacture of rubber and plastic products (NACE 25);

Table 5: Threats to Identification

| | Excluding Industries | | | Excluding Countries | | | Including | Placebo |
|---|---|---|---|---|---|---|---|---|
| | GDP Corr. (1) | Energy Intens. (2) | Volatile (3) | CN (4) | Eng.-Speaking (5) | EU (6) | US & Canada (7) | (8) |
| 2SLS (2nd stage) | | | | | | | | |
| *ICS* | 1.193*** | 1.554*** | 1.500*** | 1.315*** | 1.190*** | 2.866*** | 1.554** | |
| | [0.309] | [0.431] | [0.415] | [0.427] | [0.396] | [0.812] | [0.759] | |
| Future *ICS* | | | | | | | | -0.258 |
| | | | | | | | | [0.452] |
| $R^2$ | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.57 | 0.58 | 0.58 |
| Obs. | 29057 | 28687 | 28618 | 29459 | 29459 | 29459 | 29459 | 22710 |
| 2SLS (1st stage) | | | | | | | | |
| *World exp* | 0.137*** | 0.142*** | 0.141*** | 0.166*** | 0180*** | 0.060*** | 0.116*** | |
| | [0.008] | [0.005] | [0.006] | [0.010] | [0.010] | [0.030] | [0.008] | |
| Future *World exp* | | | | | | | | 0.199*** |
| | | | | | | | | [0.015] |
| Kleibergen-Paap *F*-Statistic | 263.5 | 777.8 | 601.7 | 297 | 303.1 | 314.9 | 210.1 | 175.1 |

*Notes.* The dependent variable is GHQ-12, rescaled between 0 and 100. Column (1) excludes industries with the highest correlation between their own output and UK GDP (all 3-digit industries within sectors: NACE 23, 25, 32, 62, and 64). Column (2) excludes the most energy-intensive industries (all 3-digit industries within sectors: NACE 21, 23, 24, 26, and 27). Column (3) excludes volatile industries (all 3-digit industries within sectors: NACE 17, 18, 19, 26, 27, 28, and 30). Column (4) reconstructs the instrument *World exp* excluding the members of the Commonwealth of Nations from both the origin and destination countries. Column (5) does the same but excludes all English-speaking countries. Column (6) similarly excludes the 27 other members of the EU. Column (7) reconstructs the instrument adding the US and Canada among the origin and destination countries. Column (8) regresses GHQ-12 at time $t$ on *ICS* computed between $t$ and $t+5$, using the BHPS waves for 1995-2000. All regressions include the same controls and fixed effects as in column (7) of Table 3. The standard errors are corrected for two-way clustering at the individual and sector level. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

energy-intensive industries.[31] In column (3), we finally exclude the industries originally identified by Autor et al. (2013) as having experienced fluctuations across countries over the sample period, due to technological innovations, housing booms, and the rapid growth of emerging economies.[32] The coefficient $\beta_1$ remains stable, and close to the baseline estimate, across all these sub-samples.

In columns (4)-(6), we reconstruct the instrument by excluding, from both the origin and the destination countries, different groups of economies (besides the US and Canada) whose shocks may be relatively more likely to be correlated with those in the UK. In column (4), we drop all the members of the Commonwealth of Nations (CN), which are linked to the UK by a past colonial ties and current economic cooperation. In column (5), we instead exclude all English-speaking countries, given that language similarity is an important determinant of bilateral relations. In column (6), we exclude the 27 other members of the EU, which are both

Manufacture of radio, television and communication equipment and apparatus (NACE 32); Air transport (NACE 62); Post and telecommunications (NACE 64).

[31] These are all industries in the following 2-digit sectors: Manufacture of pulp, paper and paper products (NACE 21); Manufacture of coke, refined petroleum products and nuclear fuel (NACE 23); Manufacture of chemicals and chemical products (NACE 24); Manufacture of other non-metallic mineral products (NACE 26); Manufacture of basic metals (NACE 27).

[32] These are all industries in the following 2-digit sectors: Manufacture of textiles (NACE 17); Manufacture of wearing apparel; dressing and dyeing of fur (NACE 18); Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear (NACE 19); Manufacture of other non-metallic mineral products (NACE 26); Manufacture of basic metals (NACE 27); Manufacture of fabricated metal products, except machinery and equipment (NACE 28); Manufacture of office machinery and computers (NACE 30).

geographically close to the UK and economically integrated with it. We find no substantial change in the main results. In column (7), for completeness, we report the results obtained when reconstructing our baseline instrument without excluding the US and Canada.

Finally, we ask whether the above results may reflect a secular increase in mental distress rather than the specific effect of growing trade exposure. To this purpose, in column (8), we perform a placebo exercise, testing whether future import competition shocks predict past levels of mental distress. We focus on the BHPS waves between 1995 and 2000, and regress GHQ-12 scores at time $t$ on $ICS$ computed between $t$ and $t+5$; we reconstruct the instrument $World\ exp$ accordingly. The estimated coefficient is small and not statistically significant, suggesting that our results are unlikely to reflect industry-specific trends that antedate the import competition shocks.

### 5.1.3 Extensions

We now extend the baseline analysis to consider: (i) other definitions of import competition; (ii) shocks of different length; and (iii) alternative measures of mental distress or indirect proxies for it.

**Definitions of import competition.** In Table 6, we consider other definitions of import competition. In column (1), we define import competition as the ratio of imports over production—an indicator that does not reflect changes in absorption due to variation in net exports—and reconstruct $ICS$ as the five-year percentage change in this new measure. The coefficient $\beta_1$ is unchanged. In column (2), we reconstruct $ICS$ using net imports (i.e., imports minus exports) normalized by production, to account for possible effects of contemporaneous export shocks. The point estimate is not statistically different from the baseline coefficient, which is not surprising given that our specification already conditions on the industry's pre-existing level of export intensity. Finally, in column (3), we obtain the same results by using the real value of imports to construct $ICS$, thereby avoiding the adoption of any normalization.[33]

**Shock length.** We now consider import competition shocks of different lengths. We reconstruct $ICS$ for windows of one up to four years, and compare the estimates with those of our baseline definition (five-year window). The results are displayed in Figure 4, where each shock is rescaled by its sample mean for comparability. The estimates of $\beta_1$ are all positive, precisely estimated, and not statistically different from each other.

This analysis also helps us shed light on how changes in individuals' reference point may affect our baseline evidence. If people got used to *lower* levels of mental distress as a result of globalization, then our estimates could pick up the improvement in the usual condition rather than a genuine increase in mental distress. The reference point is less likely to adjust over shorter time horizons, since it normally takes some years for individuals to accommodate large

[33]Note that this definition of $ICS$ is identical to any alternative definition that uses imports normalized by a constant denominator (e.g., production or employment at the beginning of the sample).

Table 6: Definitions of Import Competition

| | (1) | (2) | (3) |
|---|---|---|---|
| 2SLS (second stage) | | | |
| *ICS* (imports/production) | 1.561*** | | |
| | [0.431] | | |
| *ICS* (net imports/production) | | 1.912*** | |
| | | [0.524] | |
| *ICS* (imports) | | | 1.378*** |
| | | | [0.379] |
| $R^2$ | 0.58 | 0.58 | 0.58 |
| Obs. | 29459 | 29459 | 29459 |
| 2SLS (first stage) | | | |
| *World exp* | 0.136*** | 0.111*** | 0.154*** |
| | [0.007] | [0.007] | [0.007] |
| Kleibergen-Paap *F*-Statistic | 376.7 | 458.2 | 290.6 |

*Notes*. The dependent variable is GHQ-12, rescaled between 0 and 100. In each column *ICS* is reconstructed as the five-year percentage change in the corresponding measure of import competition: imports over production in column (1); net imports (imports minus exports) over production in column (2); and imports in column (3). All regressions include the same controls and fixed effects as in column (7) of Table 3. The standard errors are corrected for two-way clustering at the individual and sector level. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

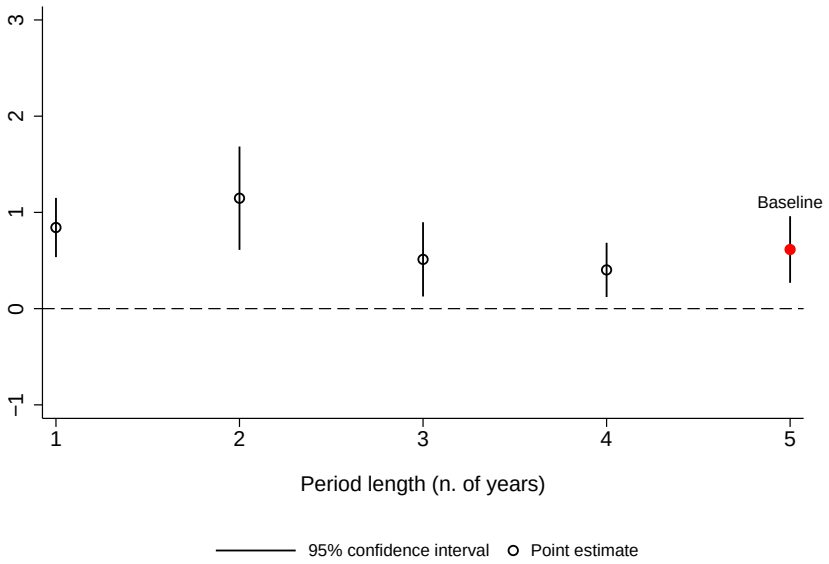
economic events (Clark and Georgellis, 2013; Ferrer-i Carbonell and Van Praag, 2008). The results displayed in Figure 4 show a slight decrease in the point estimate as the window length increases. If anything, this suggests that individuals get used to *higher* levels of mental distress after a sufficiently long exposure to import competition.

**Dimensions of and proxies for mental distress.** Here, we extend the analysis in three directions. First, we exploit the three components of GHQ-12 to study how import competition shocks affect different dimensions of mental distress. Second, we draw from the BHPS information on a number of conditions and behaviors that could be related to mental distress, and study how these proxies react to trade exposure. Third, we build on the medicine literature to benchmark GHQ-12 against two clinically meaningful thresholds, and study how trade exposure affects the likelihood for individuals to be above them.

The results are reported in Table 7. In panel a), we re-estimate eq. (1) using each of the three components of GHQ-12 as the dependent variable: anxiety and depression in column (1), social dysfunction in column (2), and loss of confidence in column (3). We rescale each component to range between 0 and 100 for comparability. The coefficient $\beta_1$ is positive and highly significant in all columns, implying that trade exposure worsens all dimensions of mental distress, with the largest adjustment occurring in the form of a loss of confidence.

In panel b) we revisit, using our individual-level panel data, some of the evidence from contemporaneous studies based on regional data or repeated cross sections for the US (Adda and Fawaz, 2017; Lang et al., 2017; Pierce and Schott, 2017). To this purpose, we replace GHQ-12 with indirect proxies for mental distress. The first two variables are dummies for whether

Figure 4: Shock Length




*Notes*. The figure plots the coefficients on *ICS* estimated from separate 2SLS regressions with the same controls and fixed effects as in column (7) of Table 3. In each regression, *ICS* is constructed as the percentage change in import competition over a different period, whose length is indicated on the horizontal axis. Each *ICS* is rescaled by the corresponding sample mean. The 95% confidence intervals refer to standard errors corrected for two-way clustering at the individual and sector level.

the individual exhibits clinical conditions related to anxiety, depression, and psychiatric problems (column 4), or to strokes (column 5). The next three variables are instead related to health behavior. The first two are dummies for whether the individual has problems with alcohol and drugs (column 6) or is a smoker (column 7). The third variable is the number of cigarettes smoked per day (column 8).[34] The estimated coefficients are all positive and statistically significant, implying that import competition shocks raise the probability that individuals suffer from anxiety and depression or strokes, the likelihood that individuals become smokers, and the number of cigarettes they smoke per day.

The variables used in panel b) capture mental distress only as long as it develops into a change in behavior or a clinical condition (and a particularly bad one in the case of strokes). On the contrary, the GHQ-12 measure allows capturing the entire spectrum of mental distress. As we now show, this is important because trade exposure significantly affects mental distress even if it does not flow into a serious disorder.

We proceed by benchmarking GHQ-12 against two values that are often considered as critical thresholds in the medicine literature (e.g., Easton and Turner, 1991; Goldberg et al., 1997; Bradshaw et al., 1998). The first value is 12 (on the 0-36 scale), which is normally used by clinicians for screening purposes, as it signals a psychiatric disorder. The second value is 18, which is associated with an increased likelihood of suicidal ideation. For each threshold, we construct

[34]The correlation between these variables and GHQ-12 is positive but not high. The correlation coefficient is 0.03 for the proxies related to strokes, alcohol and drugs, or smoking, and 0.3 for the proxy related to anxiety and depression.

Table 7: Measures of Mental Distress

| | a) GHQ-12 Components | | | b) Conditions and Behaviors | | | | | c) GHQ-12 Thresholds | | d) $GHQ$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Anxiety & Depression (1) | Social Dysfunction (2) | Loss of Confidence (3) | Depression & Pychiatric Prob. (4) | Stroke (5) | Alcohol & Drugs (6) | Smoker (7) | Number of Cigarettes (8) | $GHQ \geq 12$ (9) | $GHQ \geq 18$ (10) | (11) |
| 2SLS (2nd stage) | | | | | | | | | | | |
| *ICS* | 1.231** | 1.525*** | 2.160*** | 0.011* | 0.006** | 0.003*** | 0.021*** | 0.442*** | 0.024* | 0.051*** | 0.775*** |
| | [0.548] | [0.544] | [0.420] | [0.006] | [0.002] | [0.001] | [0.006] | [0.151] | [0.012] | [0.013] | [0.277] |
| $R^2$ | 0.62 | 0.48 | 0.64 | 0.589 | 0.42 | 0.57 | 0.88 | 0.90 | 0.55 | 0.47 | 0.59 |
| Obs. | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 | 29459 | 26415 |
| 2SLS (1st stage) | | | | | | | | | | | |
| *World exp* | 0.138*** | 0.138*** | 0.138*** | 0.138*** | 0.138*** | 0.138*** | 0.138*** | 0.138*** | 0.138*** | 0.138*** | 0.141*** |
| | [0.007] | [0.007] | [0.007] | [0.007] | [0.007] | [0.007] | [0.007] | [0.007] | [0.007] | [0.007] | [0.008] |
| Kleibergen-Paap *F*-Statistic | 371.9 | 371.9 | 371.9 | 371.9 | 371.9 | 371.9 | 371.9 | 371.9 | 371.9 | 371.9 | 319.4 |
| Sample | All | All | All | All | All | All | All | All | All | All | $GHQ < 18$ |

*Notes*. The dependent variables are reported in the columns' headings and are: the three components of GHQ-12 (each rescaled between 0 and 100) related to anxiety and depression (column 1), social dysfunction (column 2), and loss of confidence (column 3); dummies for whether the individual exhibits clinical conditions related to anxiety, depression, or psychiatric problems (column 4), strokes (column 5), or alcohol and drugs (column 6); a dummy for whether the individual is a smoker (column 7); the number of cigarettes smoked per day (column 8); dummies for whether GHQ-12 is greater than or equal to 12 (column 9) or 18 (column 10) on a 0-36 scale; and GHQ-12, rescaled between 0 and 100 (column 11). The regression in column (11) is estimated on the sub-sample of workers with GHQ-12 below 18 on a 0-36 scale. All regressions include the same controls and fixed effects as in column (7) of Table 3. The standard errors are corrected for two-way clustering at the individual and sector level. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

a dummy equal to 1 for workers whose GHQ-12 is equal to or greater than the threshold. In columns (9) and (10), panel c), we re-estimate eq. (1) using each of these dummies as the dependent variable in place of GHQ-12. The coefficient on $ICS$ is positive and significant in both cases, implying that import competition shocks raise the probability that individuals develop a clinically relevant mental disorder or a suicidal ideation. The latter result complements the cross-county evidence for the US, according to which trade exposed localities exhibit relatively higher rates of deaths or hospital admissions due to suicides (Adda and Fawaz, 2017; Lang et al., 2017; Pierce and Schott, 2017). Yet, column (11) shows that there is significant action also below this threshold. In particular, we re-estimate eq. (1) using GHQ-12 as the dependent variable, but restricting the sample to workers whose GHQ-12 is below 18. The coefficient on $ICS$ is positive and very precise also on this sub-sample. The point estimate is quantitatively large, explaining approximately half of the baseline coefficient $\beta_1$. Hence, trade exposure increases mental distress also for workers whose mental conditions are not yet serious enough to develop into either clinical conditions or extreme changes in behavior that can be captured through indirect proxies such as suicides.

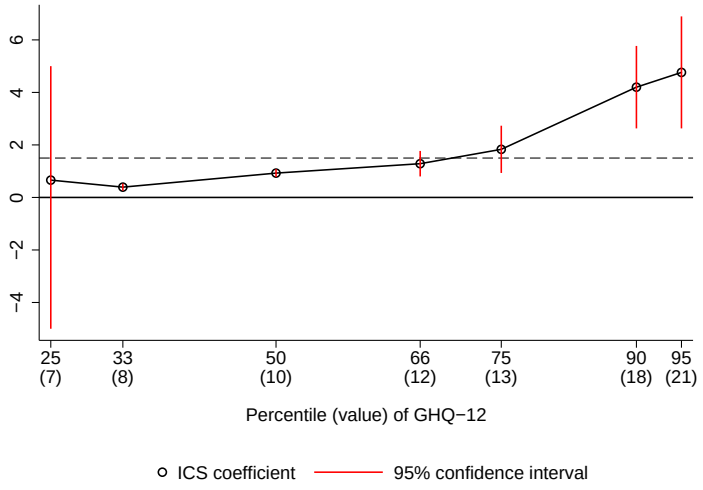
### 5.2 Within-Industry Heterogeneity

The previous section has analyzed the consequences of import competition shocks for the average worker in an industry. The results show that the representative worker in a more trade exposed industry experiences a larger increase in mental distress compared to the representative worker in a less exposed industry. This implies that import competition shocks contribute to increasing inequality in subjective wellbeing across industries. In this section, we investigate whether and how import competition shocks influence inequality across workers also within the same industry.

To this purpose, we study how the effects of import competition shocks vary along the distribution of GHQ-12. We employ a recent technique for the IV estimation of unconditional quantile treatment effects (Powell, 2016).[35] The main results are depicted in Figure 5. We report the estimates of the coefficient $\beta_1$ for relevant percentiles of the GHQ-12 distribution, namely, the three quartiles (25th, 50th, and 75th percentile) and the two terciles (33rd and 66th). Moreover, to highlight the effects of trade exposure on the right tail of the distribution, we also show the estimates for the 90th and 95th percentiles. The horizontal axis reports in parentheses the value of GHQ-12 corresponding to each percentile. We find a striking monotonically increasing trend in the effects of trade exposure. The coefficient $\beta_1$ is close to zero and highly imprecisely estimated at the bottom quartile of the distribution. Then, the effect becomes statistically significant and grows sharply in magnitude, passing from 0.39 (s.e. 0.07) at the first tercile, to 1.83 (s.e. 0.46) at the 75th percentile, to 4.76 (s.e. 1.09) at the 95th percentile. These findings imply that the effects of import competition shocks are not equally borne by all workers in an industry

[35] This estimator solves the issue that the inclusion of fixed effects in standard quantile regression models alters the interpretation of the coefficient on the treatment variable. To ensure convergence, we apply this methodology to the parsimonious specification in column (1) of Table 3.

Figure 5: Effects of Trade Exposure along the Distribution of Mental Distress




*Notes*. The figure plots the coefficients on *ICS* obtained for different quantiles of the GHQ-12 distribution, by estimating the same specification as in column (1) of Table 3 by 2SLS quantile regressions. The dashed line corresponds to a value of 1.5, i.e., the coefficient on *ICS* for the average of GHQ-12 (see column 1 of Table 3).

but are significantly stronger on the right tail of the mental distress distribution. Hence, trade exposure increases inequality in subjective wellbeing also across workers within an industry.

We now exploit the information on individual, household, and job characteristics contained in the BHPS to analyze how different groups of workers within an industry perceive the effects of import competition shocks. In Table 8, we focus on individual and household attributes, while in Table 9 we concentrate on job characteristics. In each table, we augment eq. (1) by adding interactions between *ICS* and these characteristics.[36] As done in our previous analysis, each characteristic is measured at time $t-6$ to ensure that it is not itself influenced by the shock. We instrument each interaction using the interaction between the instrument *World exp* and the corresponding characteristic.

Column (1) of Table 8 studies heterogeneity by gender, through the interaction between *ICS* and a dummy equal to 1 for males. Column (2) explores heterogeneity by age, by adding the interaction between *ICS* and a dummy for young workers (aged below 30). Column (3) looks at heterogeneity by educational level, by adding the interaction between *ICS* and a dummy for workers with no qualification. Column (4) studies the role of household size, by adding the interactions between *ICS* and three dummies, equal to 1 for households composed of, respectively, a single person, three or four people (i.e., typically a couple plus one or two children), and more than four individuals (the excluded category is therefore households composed of two members). Column (5) considers the role of individuals' financial situation, by adding the interaction between *ICS* and a dummy equal to 1 for individuals who report a financial con-

[36]The linear terms of these characteristics that are not absorbed by the individual fixed effects are included as well in the augmented specifications. These coefficients are not tabulated in Tables 8 and 9 in the interest of both space and readability. For the same reason, Tables 8 and 9 do not report the large set of first-stage coefficients from these regressions. All these results are available from the authors upon request.

Table 8: Heterogeneity - Individual and Household Characteristics

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $ICS$ | 1.159*** | 1.172*** | 1.541*** | 1.284*** | 2.028*** | 0.600 |
| | [0.389] | [0.404] | [0.427] | [0.371] | [0.504] | [0.400] |
| $ICS \times male$ | 1.091** | | | | | 0.712 |
| | [0.447] | | | | | [0.429] |
| $ICS \times age \leq 30$ | | 4.434*** | | | | 4.830*** |
| | | [0.814] | | | | [0.752] |
| $ICS \times no\ qualif.$ | | | 0.650 | | | 0.949 |
| | | | [0.836] | | | [0.841] |
| $ICS \times HH\ size = 1$ | | | | 1.354** | | 1.899*** |
| | | | | [0.575] | | [0.641] |
| $ICS \times HH\ size \in (2,4]$ | | | | -0.144 | | 0.540 |
| | | | | [0.453] | | [0.413] |
| $ICS \times HH\ size > 4$ | | | | 2.214*** | | 3.151*** |
| | | | | [0.433] | | [0.474] |
| $ICS \times good\ fin.\ cond.$ | | | | | -1.302*** | -1.108*** |
| | | | | | [0.398] | [0.388] |
| $R^2$ | 0.58 | 0.57 | 0.58 | 0.58 | 0.58 | 0.56 |
| Obs. | 29459 | 29459 | 29459 | 29459 | 29456 | 29456 |
| Kleibergen-Paap $F$-Statistic | 154.4 | 43.8 | 97.9 | 67.2 | 164.5 | 9.1 |

*Notes*. The dependent variable is GHQ-12, rescaled between 0 and 100. In each column, $ICS$ is interacted with dummies for different individual characteristics (as indicated in the table) measured at time $t-6$. The linear terms of these characteristics, when not absorbed by the individual fixed effects, are included as well in the regressions but are not tabulated. The interaction between $ICS$ and a given characteristic is instrumented using the interaction between $World\ exp$ and that characteristic. All regressions include the same controls and fixed effects as in column (7) of Table 3. The standard errors are corrected for two-way clustering at the individual and sector level. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

dition allowing them to leave comfortably. Finally, column (6) includes all these interactions jointly. We find substantial heterogeneity in the effects of import competition shocks. In particular, trade exposure has substantially more detrimental effects for workers who are young, single, members of very large households, and in financial distress.

Table 9 looks at job attributes. Column (1) explores heterogeneity between employed and self-employed workers. The results show that self-employed workers are sheltered from the effects of trade exposure. This is in line with survey evidence for the UK, showing that self-employed workers tend to be less mentally distressed than salaried workers, because self-employment gives them more freedom and control over their job (Dellot, 2014).[37] In the remaining columns, we therefore restrict the sample to salaried workers and study heterogeneity in the effect of trade exposure across different job characteristics. Columns (2) and (3) look at the type of contract, by adding the interactions of $ICS$ with dummies for workers on temporary and part-time contracts, respectively. Column (4) investigates heterogeneity across occupations, by adding the interaction of $ICS$ with a dummy for blue collar occupations.[38] Column (5) explores the role of job tenure, by adding the interaction of $ICS$ with a dummy equal to 1 if the worker

[37] Consistent with this evidence, recent sociological studies for the US find that self-employed individuals tend to be happier than the employed workers, thanks to a greater autonomy on the job and a resulting higher job satisfaction (Tuttle and Garr, 2009).

[38] These are all occupations in the following major groups of the SOC classification: 5 (Skilled Trade Occupations), 8 (Process, Plant and Machine Operatives), and 9 (Elementary Occupations).

Table 9: Heterogeneity - Job Characteristics

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *ICS* | 1.444*** | 1.459*** | 1.484*** | 1.514*** | 0.701* | 0.731* |
| | [0.415] | [0.398] | [0.403] | [0.419] | [0.381] | [0.401] |
| *ICS* × *self empl.* | -2.647*** | | | | | |
| | [0.652] | | | | | |
| *ICS* × *temporary* | | 0.634 | | | | 1.272 |
| | | [0.597] | | | | [1.025] |
| *ICS* × *part time* | | | -0.117 | | | -0.486 |
| | | | [0.336] | | | [0.379] |
| *ICS* × *blue collar* | | | | 1.869*** | | 1.927*** |
| | | | | [0.676] | | [0.662] |
| *ICS* × *tenure* $< 5$ | | | | | 1.523*** | 1.386*** |
| | | | | | [0.383] | [0.418] |
| $R^2$ | 0.58 | 0.59 | 0.59 | 0.59 | 0.60 | 0.60 |
| Obs. | 29459 | 26386 | 26334 | 26398 | 23703 | 23670 |
| Kleibergen-Paap *F*-Statistic | 249.2 | 283.9 | 621.6 | 102.6 | 140.8 | 42.6 |
| Sample | All | Excl. self empl. | Excl. self empl. | Excl. self empl. | Excl. self empl. | Excl. self empl. |

*Notes*. The dependent variable is GHQ-12, rescaled between 0 and 100. In each column, *ICS* is interacted with dummies for different job characteristics (as indicated in the table) measured at time $t-6$. The linear terms of these characteristics, when not absorbed by the individual fixed effects, are included as well in the regressions but are not tabulated. The interaction between *ICS* and a given characteristic is instrumented using the interaction between *World exp* and that characteristic. Each regression is estimated on the sample of workers indicated at the bottom of the corresponding column. All regressions include the same controls and fixed effects as in column (7) of Table 3. The standard errors are corrected for two-way clustering at the individual and sector level. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

has been with the same employer for less than five years. Finally, column (6) includes all these variables together. We find that, while import competition shocks have no differential effect across contracts of different types, they raise mental distress significantly more for blue-collar and short-tenure workers.

To summarize, the evidence in this section depicts a coherent picture, showing that import competition shocks increase inequality in mental distress also across workers within industries. The reason is that trade exposure systematically batters individuals whose characteristics make them less resilient and more vulnerable to these shocks.

### 5.3 Mechanisms

We now explore the mechanisms through which trade exposure affects individuals' mental distress, building on the literature on the economic determinants of mental health. The results are reported in Table 10. We proceed in two steps. First, we study the correlation between mental distress and proxies for different mechanisms (panel a). Then, we study the effects of import competition shocks on each of these proxies (panel b).

As a first mechanism, we analyze the role of job displacement, given that job losses are typically associated with an increase in mental distress. As a first step, in column (1), panel a), we regress GHQ-12 on a dummy equal to 1 if a worker switches out of employment in a given year, controlling for all the variables and fixed effects included in eq. (1). The results show that switching out of employment is strongly positively correlated with mental distress in our data. As a second step, in panel b), we run a 2SLS regression of the switching dummy on *ICS*

Table 10: Mechanisms

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | a) GHQ-12 and Correlates of Mental Distress (Dep. Var.: GHQ-12; Estimator: OLS) | | | | | | | | |
| *Switch out empl.* | 2.243*** | | | | | | | | |
| | [0.293] | | | | | | | | |
| *Wage growth* | | -0.610*** | -0.442*** | -0.517*** | -0.625*** | -0.583*** | -0.505*** | -0.422*** | -0.510*** |
| | | [0.094] | [0.102] | [0.104] | [0.098] | [0.099] | [0.097] | [0.104] | [0.106] |
| *Job sat.* (overall) | | | -5.918*** | | | | | -5.943*** | -5.824*** |
| | | | [0.161] | | | | | [0.168] | [0.151] |
| *Job sat.* (pay) | | | | -1.947*** | | | | | |
| | | | | [0.262] | | | | | |
| *Job sat.* (security) | | | | | -3.077*** | | | | |
| | | | | | [0.131] | | | | |
| *Job sat.* (workload) | | | | | | -3.309*** | | | |
| | | | | | | [0.132] | | | |
| *Job sat.* (job itself) | | | | | | | -4.946*** | | |
| | | | | | | | [0.245] | | |
| *Expect.* (promotion) | | | | | | | | -0.588*** | |
| | | | | | | | | [0.140] | |
| *Expect.* (financial) | | | | | | | | | -1.954*** |
| | | | | | | | | | [0.163] |
| $R^2$ | 0.59 | 0.59 | 0.60 | 0.59 | 0.59 | 0.60 | 0.60 | 0.61 | 0.61 |
| Obs. | 29459 | 23329 | 23321 | 23281 | 23242 | 23300 | 23293 | 22290 | 22634 |

| | b) Correlates of Mental Distress and Trade Exposure | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Switch out Empl. | Wage Growth | Job Sat. (Overall) | Job Sat. (Pay) | Job Sat. (Security) | Job Sat. (Workload) | Job Sat. (Job Itself) | Expect. (Promotion) | Expect. (Financial) |
| 2SLS (2nd stage) | | | | | | | | | |
| *ICS* | 0.024** | -0.034*** | -0.054*** | 0.009 | -0.048*** | -0.014 | -0.038** | -0.033*** | -0.014** |
| | [0.009] | [0.011] | [0.011] | [0.021] | [0.008] | [0.014] | [0.014] | [0.011] | [0.005] |
| *Wage growth* | | | 0.028*** | 0.065*** | 0.018*** | 0.007* | 0.022*** | 0.004 | -0.005* |
| | | | [0.004] | [0.010] | [0.004] | [0.004] | [0.004] | [0.003] | [0.003] |
| *Job sat.* (overall) | | | | | | | | 0.012 | 0.036*** |
| | | | | | | | | [0.007] | [0.002] |
| $R^2$ | 0.49 | 0.26 | 0.52 | 0.57 | 0.52 | 0.56 | 0.53 | 0.53 | 0.42 |
| Obs. | 29459 | 23329 | 23321 | 23281 | 23242 | 23300 | 23293 | 22290 | 22634 |
| 2SLS (1st stage) | | | | | | | | | |
| *World exp* | 0.138*** | 0.144*** | 0.144*** | 0.143*** | 0.144*** | 0.144*** | 0.144*** | 0.145*** | 0.142*** |
| | [0.007] | [0.006] | [0.006] | [0.005] | [0.005] | [0.006] | [0.006] | [0.005] | [0.006] |
| Kleibergen-Paap *F*-Statistic | 371.9 | 680.6 | 679.1 | 699.0 | 703.8 | 698.2 | 698.8 | 775.4 | 645.4 |
| Sample | All | Excluding displaced | Excluding displaced | Excluding displaced | Excluding displaced | Excluding displaced | Excluding displaced | Excluding displaced | Excluding displaced |

*Notes*. In panel a), the dependent variable is GHQ-12, rescaled between 0 and 100. The regressions are estimated by OLS. In panel b), the dependent variables are indicated in the columns' headings. The regressions are estimated by 2SLS. *Switch out empl* is a dummy equal to 1 if a worker switches out of employment in a given year. *Wage growth* is the yearly percentage change in each worker's gross wage. *Job sat.* (overall) is a dummy equal to 1 if the individual declares to be satisfied with her job. *Job sat.* (pay) is a dummy equal to 1 if the individual declares to be satisfied with her pay. *Job sat.* (security) is a dummy equal to 1 if the individual declares to be satisfied with her job security. *Job sat.* (workload) is a dummy equal to 1 if the individual declares to be satisfied with her workload. *Job sat.* (job itself) is a dummy equal to 1 if the individual declares to be satisfied with the content of her job. *Expect.* (promotion) is a dummy equal to 1 if the individual wishes to obtain a better job with the current employer over the next year, and expects this to actually happen. *Expect.* (financial) is a dummy equal to 1 if the individual expects a stable or improved financial situation over the next year. Each regression is estimated on the sample of workers indicated at the bottom of the corresponding column: all workers in column (1), and workers who do not switch out of employment in a given year (i.e., non-displaced workers) in columns (2)-(9). All regressions include the same controls and fixed effects as in column (7) of Table 3. The standard errors are corrected for two-way clustering at the individual and sector level. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

and the whole set of controls. We find a positive and statistically significant coefficient on $ICS$, implying that trade exposure raises the probability of leaving employment in the UK. Overall, these results jointly suggest that a first mechanism through which import competition shocks affect individuals' mental distress is by increasing the risk of job displacement.

Next, we provide evidence that the effects of trade exposure are not contained to displaced individuals, but extend to the wider population of workers. One mechanism through which this happens is related to wage changes. In column (2), panel a), we restrict the sample to

workers who do not switch out of employment in a given year, and regress GHQ-12 on the yearly percentage change in each worker's gross wage, along with all the usual controls. We find wage growth to be strongly negatively correlated with mental distress. In panel b), we regress wage growth on *ICS* and the same controls. The coefficient on *ICS* is negative and highly statistically significant, implying that 1 s.d. increase in *ICS* reduces wage growth by 3.4%. Taken together, these results suggest that import competition raises the mental distress of non-displaced workers by flattening their wage profile.

We now study how import competition shocks affect the mental distress of workers who remain employed at given wage growth. The consequences of import competition for workers who experience no change in their observable labor market conditions remain under-studied. We provide evidence that also these workers are affected by trade exposure, through different mechanisms that are not captured by standard labor market outcomes such as job status and wage growth. One channel is related to job satisfaction. In column (3), panel a), we regress GHQ-12 on a dummy equal to 1 if the individual declares to be satisfied with her job. As in column (2), we restrict the sample to workers who do not switch out of employment in a given year, and add wage growth among the controls. The results show that individuals who are less satisfied with their job are significantly more distressed. In panel b), we regress the dummy for job satisfaction on *ICS*, using the same sample of workers and the same controls as in panel a). We find that import competition shocks reduce the probability that an employed worker declares to be satisfied with her job, conditional on her wage change.

Our data allow us to probe deeper into the reasons why import competition reduces job satisfaction. Indeed, the BHPS inquires individuals about four determinants of job satisfaction: total pay, job security, workload (hours worked), and the content of the job. We construct four dummies equal to 1 if the individual declares to be satisfied with each aspect of the job. In columns (4)-(7), panel a), we find that all these dimensions of job satisfaction are negatively correlated with GHQ-12. In panel b), we regress each of the four dummies on *ICS* and the other controls used in column (3). We find that import competition does not lead to a significant deterioration in workers' satisfaction with their pay, consistent with the fact that we are already conditioning on the actual change in wages. Instead, import competition reduces satisfaction with the working conditions, in terms of job security and workload, although the latter coefficient is not precisely estimated.[39] Overall, our evidence suggests that import competition shocks make non-displaced workers perceive their jobs as becoming more unstable and demanding, as if firms passed on to their employees part of the increased competitive pressure from trade. The deterioration in working conditions seems to be strong enough to lower satisfaction with the content of the job itself, as shown in column (7).

The last mechanism we consider is related to expectations. To study this channel, we con-

[39] In unreported regressions, we have used the information on the total number of hours worked reported in the BHPS to shed more light on the role of workload. Previous studies find that the number of hours worked is negatively associated with job satisfaction (Chongvilaivan and Powdthavee, 2014). Consistent with the results in column (6), panel b), we find that import competition leads to a significant increase in the number of hours worked (coefficient 0.007, s.e. 0.004), confirming that trade exposure induces firms to switch to longer and more demanding working schedules.

struct two new variables using information contained in the BHPS. The first variable captures expectations about job promotion. It is a dummy for whether the individual wishes to obtain a better job with the current employer over the next year, and expects this to actually happen.[40] The second variable captures instead financial expectations. It is a dummy equal to 1 if the individual expects a stable or improved financial situation over the next year. In columns (8) and (9), panel a), we regress GHQ-12 on each of these proxies for expectations. We focus on workers who do not switch out of employment in a given year, and control for wage growth and job satisfaction, to study the role of expectations on top of the previous channels. We find better expectations to be associated with lower mental distress. In panel b), we regress each proxy for expectations on $ICS$, controlling for all other variables and fixed effects. We obtain negative and significant coefficients in both specifications, implying that import competition shocks worsen expectations about job promotion and financial conditions.

To sum up, the analysis in this section shows that import competition shocks worsen individuals' mental health through four mechanisms. Two of them work through relatively standard labor market channels, whereby trade exposure raises the probability of job displacement and reduces wage growth for non-displaced workers. Our results suggest that import competition induces additional distributional effects with respect to the traditional trade-related adjustment costs, as affected workers bear not only the pecuniary losses entailed by unemployment spells and lower wage growth, but also additional costs in terms of reduced mental wellbeing. The other two mechanisms—working through job satisfaction and expectations—are less well understood and perhaps more interesting, as they show how trade exposure worsens mental distress also for the broad population of workers with unchanged labor market outcomes. These findings suggests that import shocks tend to induce distributional effects that are more pervasive than thought until now.

### 5.4 Intra-Family Spillovers

So far, we have investigated the consequences of import competition shocks for the mental distress of workers directly exposed to these shocks. In this section, we broaden the scope of the analysis, and study whether and how import competition shocks affect the family members of the exposed workers. As mentioned in the introduction, a broad literature argues that different events faced by an individual may have both horizontal repercussions within the family (i.e., for the spouse) and inter-generational spillovers (i.e., to the children). The fact that trade exposure affects workers' mental health by changing their labor market conditions, job satisfaction, and expectations suggests that import competition shocks may also alter the family equilibrium, with indirect effects on the other members. No previous study has addressed this issue. Yet, a broad understanding of the implications of trade exposure for mental distress requires knowing whether these spillovers exist and the forms in which they manifest themselves. Indeed, knowledge of these potential externalities may be fundamental for the design

[40] Böckerman and Maliranta (2013) use a similar measure of expectations in a study on outsourcing in the context of Finland.

and targeting of policy interventions.

We begin our analysis by studying horizontal spillovers across spouses. The BHPS provides information on family ties, allowing us to identify, for each worker in our sample, all her family members living under the same roof, as well as the exact relationship through which each of them is linked to the worker. Since the BHPS interviews all the adult members of each sampled household (aged 16 or more), we are able to measure mental distress, and to observe the industry of employment, for both spouses.[41] We augment our baseline specification in eq. (1) by including the import competition shock faced by the worker's spouse. We instrument the spouse's shock using the instrument *World exp* in the spouse's pre-sample industry of employment. Accordingly, the sample used for this analysis consists of individuals (i) who have a spouse, (ii) who were working at time $t-1$, and (iii) whose spouse was also working at $t-1$.

The results are reported in Table 11. Column (1) refers to the baseline estimates using GHQ-12 as the dependent variable. As shown in panel a), the augmented specification confirms our previous evidence that import competition shocks raise mental distress for the exposed workers. The coefficient on *ICS* is smaller than the baseline estimate reported in Table 3, consistent with the fact that here the analysis does not include single individuals, a category for which the effect of trade exposure is stronger than average (see Table 8). At the same time, the coefficient on the spouse's import competition shock is imprecisely estimated. These results are not driven by multicollinearity. The shocks of the two spouses are only weakly correlated in our sample (0.32), consistent with most individuals (78%) working in different industries from their spouses. Indeed, panels (b) and (c) show that the same pattern of results holds when the two shocks are separately included in the specification. In the remaining columns, we replace GHQ-12 with other proxies for mental distress.[42] The only case in which the coefficient on the spouse's shock is positive and statistically significant is in column (3), implying that the spouse's trade exposure raises the probability that a worker experiences problems related to alcohol and drugs. Overall, we find no robust evidence of intra-spouse spillovers in the sample of households where both spouses work.

We now turn to discussing inter-generational spillovers. The BHPS complements the information on adults with information on all youths (aged 11-15) who are members of the sampled households. These youths are administered a different questionnaire, containing questions about time use, health behavior, self-esteem, and life satisfaction. These aspects have been shown to be related both to future health outcomes (e.g., Currie, 2009) and to the formation of skills—especially noncognitive skills—that are good predictors of future labor market outcomes (e.g., Cunha and Heckman, 2007). We use these data to study how parental import competition shocks affect children's well-being.

The number of children aged 11-15 who are sons or daughters of the adult individuals in our baseline sample is 1,328, corresponding to approximately 3,300 observations. Using this

[41] These could be either lawful spouses or co-habiting partners.

[42] Since only 0.7% of observations refer to individuals suffering from strokes in the current estimation sample, we do not use this proxy here.

Table 11: Intra-Spouse Spillovers

| | *GHQ*-12 (1) | Depression & Psychiatric Prob. (2) | Alcohol & Drugs (3) | Smoker (4) | Number of Cigarettes (5) |
|---|---|---|---|---|---|
| | a) Own and spouse import competition shocks | | | | |
| *ICS* (own) | 0.892* | 0.010 | 0.005*** | 0.035*** | 0.437** |
| | [0.487] | [0.007] | [0.001] | [0.006] | [0.177] |
| *ICS* (spouse) | -0.601 | 0.002 | 0.007*** | 0.007 | 0.019 |
| | [0.420] | [0.006] | [0.002] | [0.006] | [0.110] |
| $R^2$ | 0.64 | 0.63 | 0.38 | 0.90 | 0.91 |
| Obs. | 13233 | 13233 | 13233 | 13233 | 13148 |
| Kleibergen-Paap *F*-Statistic | 281.2 | 281.2 | 281.2 | 281.2 | 303.5 |
| | b) Own import competition shock | | | | |
| *ICS* (own) | 0.926* | 0.010 | 0.005*** | 0.034*** | 0.436** |
| | [0.479] | [0.007] | [0.001] | [0.006] | [0.175] |
| $R^2$ | 0.64 | 0.63 | 0.39 | 0.90 | 0.91 |
| Obs. | 13233 | 13233 | 13233 | 13233 | 13148 |
| Kleibergen-Paap *F*-Statistic | 627.6 | 627.6 | 627.6 | 627.6 | 727.9 |
| | c) Spouse import competition shock | | | | |
| *ICS* (spouse) | -0.577 | 0.003 | 0.007*** | 0.008 | 0.031 |
| | [0.422] | [0.006] | [0.002] | [0.007] | [0.108] |
| $R^2$ | 0.64 | 0.63 | 0.39 | 0.90 | 0.91 |
| Obs. | 13233 | 13233 | 13233 | 13233 | 13148 |
| Kleibergen-Paap *F*-Statistic | 458.4 | 458.4 | 458.4 | 458.4 | 412.9 |

*Notes*. The dependent variables are indicated in the columns' headings and are: GHQ-12, rescaled between 0 and 100 (column 1); dummies for whether the individual exhibits clinical conditions related to anxiety, depression, or psychiatric problems (column 2), or alcohol and drugs (column 3); a dummy for whether the individual is a smoker (column 4); and the number of cigarettes smoked per day (column 5). *ICS* (own) is the import competition shock of the worker, whereas *ICS* (spouse) is the import competition shock of her spouse or co-habiting partner. The estimation sample consists of individuals (i) who have a spouse, (ii) who were working at time $t-1$, and (iii) whose partner was also employed (or self-employed) at $t-1$. All regressions include the same controls and fixed effects as in column (7) of Table 3. The standard errors are corrected for two-way clustering at the individual and sector level. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

sample, we estimate the following specification by 2SLS:

$$y_{it} = \alpha_f + \alpha_c + \alpha_t + \beta_1 IC_{pt-1} + \gamma_1 Gender_i + \varepsilon_{it}, \tag{2}$$

where $y_{it}$ is an outcome for youth $i$ in year $t$ (details below); $IC_{pt-1}$ is the import competition shock faced by parent $p$ (either the mother or the father) in year $t-1$; $\alpha_f$ are household fixed effects; $\alpha_c$ are fixed effects for the youth's cohort; $\alpha_t$ are fixed effects for the year of the interview; $Gender_i$ is a dummy equal to 1 for male youths; and $\varepsilon_{it}$ is an error term. The inclusion of household fixed effects absorbs all time-invariant household characteristics that may affect a child's well-being. The coefficient of interest, $\beta_1$, is therefore identified from the remaining variation in outcomes across youths of the same age and gender, whose parents have been exposed to different import competition shocks. The standard errors are corrected for clustering

Table 12: Intergenerational Spillovers

| | Hours Watched TV (1) | Talk to Parents (2) | Tried Smoke (3) | Feel Useless (4) | Feel Happy Appearance (5) | Feel Unhappy Life (6) |
|---|---|---|---|---|---|---|
| | a) Paternal import competition shocks | | | | | |
| 2SLS (2nd stage) | | | | | | |
| *ICS* (father) | 0.299* | 0.304* | 0.196 | 0.322* | -0.243* | 0.069* |
| | [0.154] | [0.175] | [0.125] | [0.190] | [0.142] | [0.040] |
| $R^2$ | 0.27 | 0.40 | 0.59 | 0.28 | 0.32 | 0.17 |
| Obs. | 3296 | 3268 | 3304 | 3300 | 3298 | 3300 |
| 2SLS (1st stage) | | | | | | |
| *World exp* | 0.113*** | 0.112*** | 0.108*** | 0.109*** | 0.114*** | 0.112*** |
| | [0.033] | [0.033] | [0.033] | [0.033] | [0.033] | [0.033] |
| Kleibergen-Paap *F*-statistic | 11.6 | 11.4 | 10.7 | 10.9 | 11.9 | 11.3 |
| | b) Maternal import competition shocks | | | | | |
| 2SLS (2nd stage) | | | | | | |
| *ICS* (mother) | -0.074 | 0.144 | 0.122 | 0.219 | -0.232* | 0.004 |
| | [0.114] | [0.136] | [0.104] | [0.150] | [0.127] | [0.018] |
| $R^2$ | 0.42 | 0.45 | 0.60 | 0.29 | 0.25 | 0.37 |
| Obs. | 3526 | 3357 | 3536 | 3527 | 3535 | 3539 |
| 2SLS (1st stage) | | | | | | |
| *World exp* | 0.113*** | 0.114*** | 0.112*** | 0.114*** | 0.114*** | 0.112*** |
| | [0.036] | [0.037] | [0.036] | [0.036] | [0.036] | [0.036] |
| Kleibergen-Paap *F*-statistic | 9.5 | 9.5 | 9.5 | 9.8 | 9.9 | 9.5 |

*Notes*. The sample used in this table consists of children aged 11-15 who are sons or daughters of the adult individuals belonging to the baseline sample used in previous tables. The dependent variables are indicated in the columns' headings and are: a dummy equal to 1 if the youth declares watching more than 3 hours of television per day (column 1); a dummy equal to 1 if the youth declares that she almost never talks to parents about things that are relevant for her (column 2); a dummy equal to 1 for children who declare having already tried to smoke a cigarette (column 3); a dummy equal to 1 if the youth declares that she feels completely useless (column 4); a dummy equal to 1 if the youth declares that she is completely happy with her appearance (column 5); and a dummy equal to 1 if the youth declares to be completely unhappy with her life (column 6). *ICS* (father) denotes the import competition shocks faced by the father; *ICS* (mother) denotes the import competition shocks faced by the mother. All regressions include: household fixed effects; cohort fixed effects; year of the interview fixed effects; and a gender dummy. The standard errors are corrected for clustering at the household-year level. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

by household-year to accommodate correlated shocks within households.

The results are reported in Table 12. Panel a) studies the effects of paternal import competition shocks, whereas panel b) focuses on the effects of maternal shocks.[43] In columns (1) and (2), we look at parental investment in children. Our first proxy is a dummy equal to 1 if the youth declares watching more than 3 hours of television per day.[44] The second proxy is instead a dummy equal to 1 if the youth declares that she almost never talks to parents about things that are relevant for her. In column (3), we focus on health behavior, as proxied by a dummy

[43]The results are qualitatively unchanged when both import competition shocks are jointly included, although sample size almost halves because not all parents are employed at the same time, and youths from single-parent households drop from the sample.

[44]Long time spent in front of television has been shown to be associated with less resources allocated by parents to children (e.g., Cardoso et al., 2010); we use a threshold of three hours, as indicated by the pediatric literature.

equal to 1 for children who declare having already tried to smoke a cigarette. Columns (4) and (5) consider self-esteem, as proxied by two dummies equal to 1 if the youth declares that she feels completely useless or that she is completely happy with her appearance, respectively. Finally, column (6) looks at life satisfaction, as proxied by a dummy equal to 1 for youths who declare to be completely unhappy with their life.

The results depict a coherent picure, according to which the import competition shocks faced by the father have negative spillovers on the youths. In particular, paternal trade exposure leads to a reduction in the resources invested by the family in the children, to a worsening of the youth's self-esteem, and to a decline in life satisfaction. We generally find imprecisely estimated coefficients on the import competition shocks faced by the mother. This pattern is consistent with our previous evidence that males tend to experience larger increases in mental distress compared to females as a result of trade exposure.[45]

Overall, the results of this section suggest that the impact of trade exposure on mental distress is not limited to trade exposed workers but extends to their families. In particular, the weakest members (i.e., the youths) seem to experience a worsening of various conditions that are fundamental for their later development.

# 6 Conclusion

We have studied the effects of import competition on individual mental distress, using unique longitudinal data on mental health for British residents, coupled with industry-level measures of import competition over 1995-2007. We have found that import competition shocks have large effects on mental distress. We have quantified that a worker exposed to an import competition shock equal to the sample standard deviation would need a monetary compensation of approximately £300 per year to make for up her utility loss, which implies an overall annual compensation of about 0.5% of UK GDP across all workers. We have found that the effects of trade exposure are systematically stronger on the right tail of the mental distress distribution. Using detailed data on demographics and job characteristics, we have also found that trade exposure tends to batter especially specific groups of individuals, such as those who are young, have either no or a large family, are in a bad financial condition, are employed in blue-collar occupations, and have a short job tenure. We have documented that the effects of trade exposure take place through a complex set of mechanisms. These include job displacement and lower wage growth, but also channels that are not related to the observable labor market conditions of a worker, such as reduced job satisfaction and worsened expectations about the future. Finally, we have exploited unique information on family ties to study how the effects of import competition shocks spill over to other members of a worker's family. We have found

[45]This pattern is also broadly consistent with evidence from recent empirical studies, according to which paternal economic shocks (e.g., unemployment) have stronger effects on child development than maternal shocks (Kuhn et al., 2009; Rege et al., 2011; Lindo et al., 2013). One explanation is that males are more prone than females to experience rising mental distress as a result of these shocks. Moreover, some shocks (e.g., a job loss) may lead the mother to devote more time to child rearing; this partly compensates the direct negative effect that the shock exerts on child development via the increase in the mother's mental distress.

evidence of negative spillovers on children, with paternal import competition shocks leading to a significant reduction in parental investment in child rearing, as well as to a worsening of children's self-esteem and life satisfaction.

While globalization generally induces aggregate welfare gains, our results suggest that its distributional consequences are possibly stronger and more pervasive than usually thought. From a policy perspective, our results therefore point to the need of accompanying trade liberalization with policies aimed at strengthening public mental health services and subsidizing their utilization by trade exposed workers. These services should especially be made accessible to the weakest individuals, who bear the bulk of the effects of trade exposure, and extended to the family members of trade exposed workers, especially their children. Studying the optimal size and design of these interventions seems a promising area for future research.

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