Supply and demand of independent UK music artists on the web

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ABSTRACT

As in any dynamic market, supply and demand of music are in a constant state of disequilibrium. Music charts have for many years documented the *demand* for *the most popular* music, but a more comprehensive understanding of this market has remained beyond reach. In this paper, we provide a proof of concept for how web resources now make it possible to study both demand and supply sides, accounting also for smaller, independent artists.

Categories and Subject Descriptors

H.5.5 [**Sound and Music Computing**]: Methodologies and techniques; J.4 [**Social and Behavioral Sciences**]: Sociology

1. MOTIVATION AND RELATED WORK

To increase efficiency of the music market, the disequilibrium between the demand and supply sides of music must be understood. We show how publicly accessible web data can be used to gain such an understanding for the UK. The novelty of this work compared to existing work on geolocated music twitter activity [1, 2] lies in the pairing of artists and their fans, and the fact that we aim to include the more elusive but abundant independent music artists.

2. METHODS AND RESULTS

Artist data was sourced from `reverbnation.com`, a social media site used by (mostly independent) music artists for promotion and distribution. We obtained the names, locations and genres of 54,192 music artists based in the UK. Between November 30th 2014 and March 11th 2015 we collected 6,447,566 (50, 280 geo-tagged) tweets that mentioned at least one of these artists. Artist and tweet locations were then mapped to the administrative areas in the UK: the 83 counties of England, 26 districts of Northern Ireland, 32 unitary authorities of Scotland, and 32 principal Areas of Wales. All boroughs of London (Camden etc.) were mapped to a single region. Denote the number of artists/tweets as a_i and t_i for region i respectively, and as a and t for the UK in its entirety. Considering a_i and t_i as samples from independent Poisson random variables, we can regard the respective Poisson rate parameters $\lambda_{a,i}$ and $\lambda_{t,i}$ as proxy measures for supply and demand in region i. The degree to which region i's music market is in disequilibrium can then be quantified by comparing $\log(\lambda_{a,i}/\lambda_{t,i})$ with $\log(\lambda_a/\lambda_t)$, which can be considered to correspond to the equilibrium state. Following Wald's approach [3], the Maximum Likelihood Estimate for $\log(\lambda_{a,i}/\lambda_{t,i})$ is $\mu_i = \log((a_i+0.5)/(t_i+0.5))$, with estimated variance of $\sigma_i^2 = \frac{1}{a_i+0.5} + \frac{1}{t_i+0.5}$. Due to the large population size of the UK in its entirety, $\log(\lambda_a/\lambda_t)$ can be estimated accurately as $\mu = \log(a/t)$ with negligible variance. As a measure of the disequilibrium, we used the z-score: $z_i = \frac{\mu_i - \mu}{\sigma_i}$. The left subfigure in Fig. 1 (# artists per 1,000 inhabitants) shows that artist density is not uniform across the UK: there are creative hubs of music in Bristol, Bath and North East Somerset, Glasgow and Edinburgh, the West Midlands, areas in the North West of England and in London. The central subfigure suggests that Milton Keynes and Hartlepool have the highest demand. The rightmost subfigure (z-scores) visualizes the disequilibrium between supply and demand of independent music across the UK. It highlights excess supply in the North West of England (South and West Yorkshire, Manchester), the West Midlands, Bristol, Bath and North East Somerset, and an excess demand in Milton Keynes, Leicester and Hampshire. Further insight can be gained by investigating certain genres. For example, see supply and demand of Dubstep artists in Fig. 2. This suggests a 'surplus' of Dubstep artists in Glasgow/South Yorkshire. Interestingly, this further suggests that Dubstep artists based in these areas should consider booking live concerts in nearby areas of demand (Fife/West Yorkshire) to satisfy unmet demand. Further results can be seen at our project website (`http://goo.gl/zuDCjL`). This work was supported by EPSRC grant EP/M000060/1 and ERC CoG FORSIED.

3. REFERENCES

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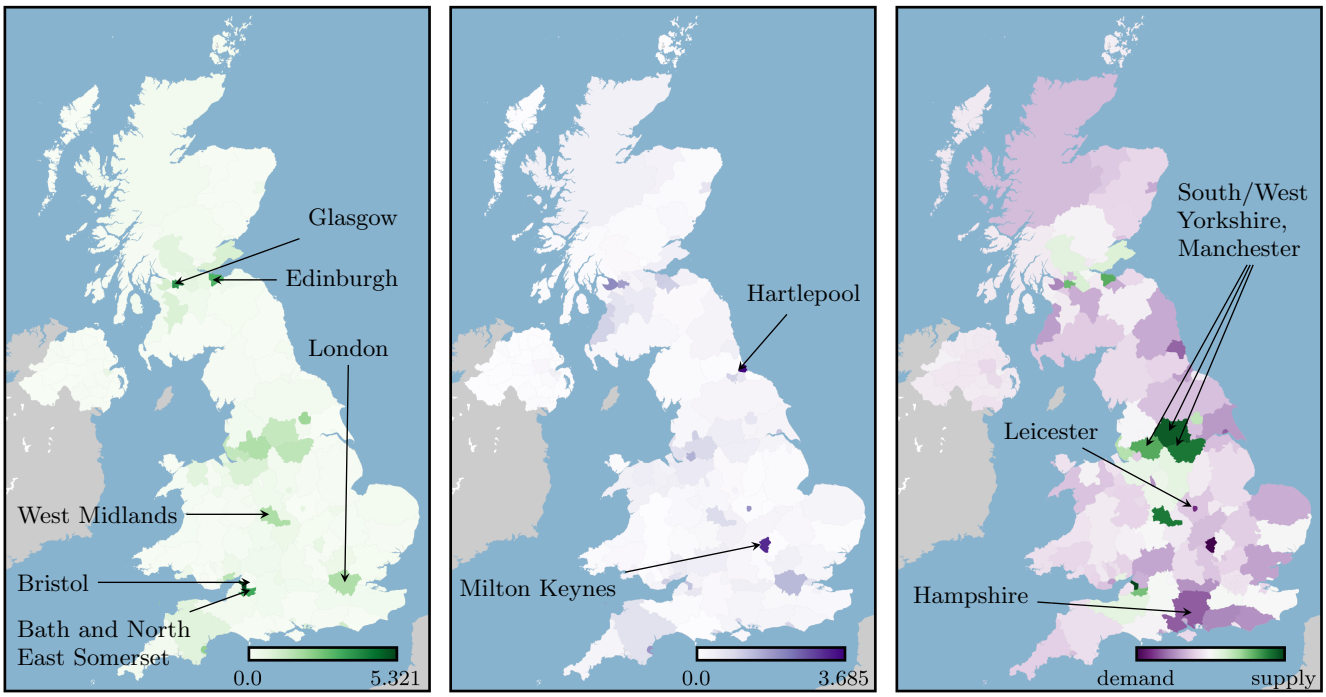
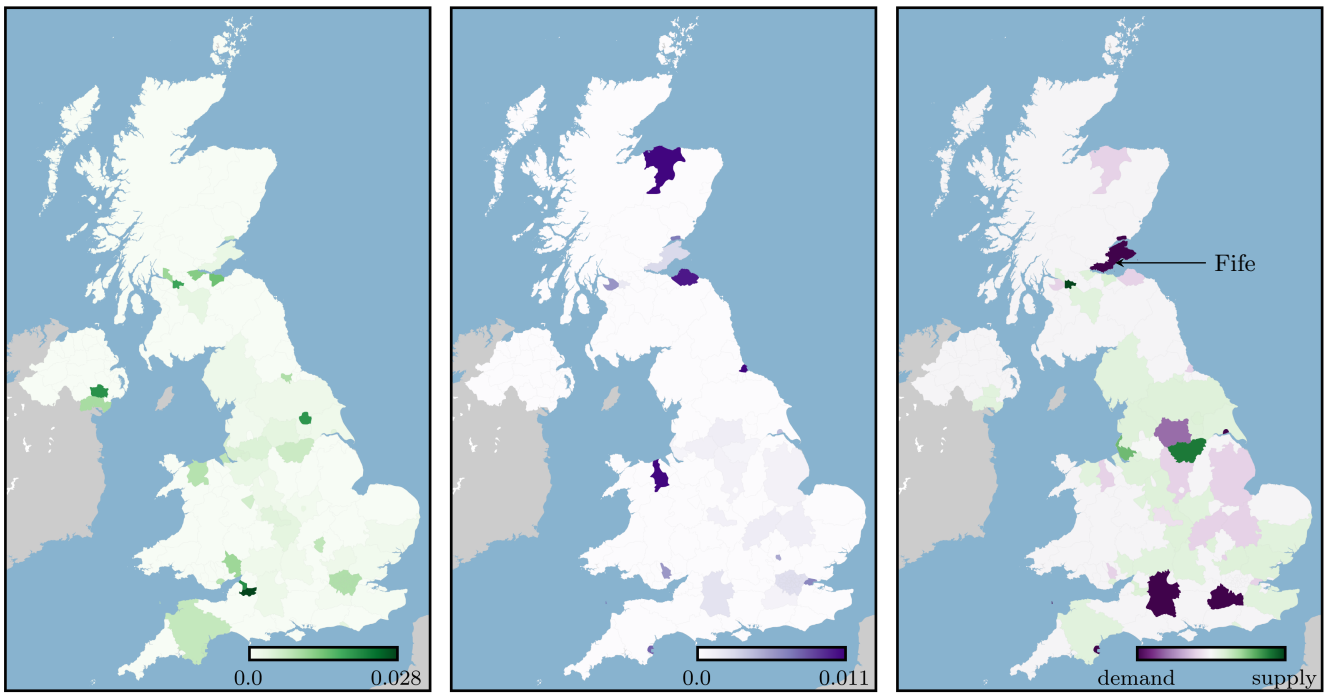


Independent All artists per 1,000 population

Tweets about independent All artists per 1,000 population

Supply and demand for independent All artists

Figure 1: Supply (left subfigure, independent artists per 1,000 inhabitants), demand (center, tweets about independent artists per 1,000 inhabitants) and relationship between supply and demand (right, z-score of log ratio) for music in the UK.



Independent Dubstep artists per 1,000 population

Tweets about independent Dubstep artists per 1,000 population

Supply and demand for independent Dubstep artists

Figure 2: Supply (left subfigure, independent artists per 1,000 inhabitants), demand (center, tweets about independent artists per 1,000 inhabitants) and relationship between supply and demand (right, z-score of log ratio) for Dupstep music in the UK.